

Teaching Commons

# A GUIDE TO LARGE CLASSROOM ASSESSMENTS

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## INTRODUCTION

In an exploratory study on Teaching and Learning in Large Classes at Ontario Universities, Kerr (2011) found that all instructors agreed that large classrooms had the following assessment related issues: First, instructors found it challenging to create authentic assessments for a large number of students. In addition, the large number of students created a considerable workload when giving feedback and marking. Providing opportunities for formative assessment were also difficult with large numbers of students as this approach also created a large workload. Finally, instructors found it was challenging to fairly assess a diverse mix of students.

This guide was created as a response to the challenges faced by instructors who teach large classrooms. It is designed to support instructors who teach large classrooms. We provide instructors with tools that allow them to think differently about assessing large classrooms, alternative assessment methods that would work with large classrooms coupled with examples from different universities and professors. Finally, this guide provides tips for managing grading and feedback in large classrooms.

The definition of a large classroom varies from one discipline to another. In some disciplines, a class of 60 students is considered a large classroom. In other disciplines, large classrooms could contain up to 1000 students and sometimes even more. Similarly, assessment practices differ from one discipline to another. Therefore, this guide serves as a description of different approaches that instructors could try. It is a by no means a prescriptive guide as some instructors might be comfortable trying some techniques and not others.

In order to tackle large classroom assessment, it is recommended that instructors scaffold their exams throughout the semester by creating smaller formative assessment instead of one big assessment. As an instructor, you could use peer- and self-assessment, or you could design group assessments instead of individual assessments

Finally, feel free to reach out to Eliana Elkhoury on [elkhour@yorku.ca](mailto:elkhour@yorku.ca) if you have any comments about the guide or if you would like to set up a meeting to discuss how you could implement those techniques in your classroom.

**Please note that this document is a work in progress.**

Special thanks to all the educational developers, teaching and learning centers, and higher education scholars around the globe. This work wouldn't have been possible without all the resources available and shared online.

What is a large classroom?

The definition of a large classroom varies from one discipline to another. In some disciplines, a class of 60 students is considered a large classroom. In other disciplines, large classrooms could contain up to 1000 students and sometimes even more.

## 1. HOW TO TACKLE ASSESSMENT OF LARGE CLASSROOMS

There are multiple techniques that you could use in your large classroom assessment. This includes using multiple choice questions, spreading your exams over the semester, using self and peer assessment, assessing groups instead of individuals, and using technology.

### i. Multiple Choice Exams Done Differently

There are many advantages to using Multiple choice questions. They could be easily graded by a computer, they are perfect for testing low order Bloom taxonomy, and they provide objective measurement of students' exams.

#### General Guidelines

- Ask Students to submit exams questions, you could frame this as a low stake assignment by itself, for example, ask the students to submit one question at the end of every session or module. This will help you build a database of questions.
- You could also ask your students to submit questions as part of their presentation.
- Write your questions throughout the term. Add questions after every module or section. This will save you time instead of writing questions before the exam.

#### Leading Practices

- Avoid using negatively worded questions, if you need to use negative questions emphasize the negative element using Italic or capital letters
- Avoid using None of the above
- Avoid using irrelevant information in the question
- Present a definite problem in the question
- Put the alternative in logical order (alphabetical or numerical)
- Use a Question Format rather than incomplete statements

#### Guides

Guide on MCQ [HERE](#)

### ii. Spread Your Exams Throughout the Semester

Doing multiple assessments can be tough in large classes, but here are some ways to make them work. Instead of having only two exams during the semester, you could include smaller assessment that spread throughout the semester. You could add smaller assessments that don't require a lot of grading time. This could be completed using classroom assessment techniques or short written assessments.

#### Short-written Assessments

Short written assessment, as the name implies are short and will not take a lot of time to grade. Short-written assessment could be done individually or in groups and they can take multiple forms such as:

- *Beginning of the class writing*: ask them for an area of confusion or give them a figure and ask them about the main point. This will give you an introduction to the session and allows you to understand where your students are confused.
- *End of the class writing*: ask them one thing they learned during this lesson or to summarize the learning in one paragraph

- *4321 Submission*: you can ask them to submit 4 key points from the chapter, 3 key terms with definitions, 2 quotes with analysis on why they're significant, and 1 question about the content. One tip could be to use good questions provided by them in the assessment.
- *Response Paper/ Reflection paper*: if you have readings due before class time, you could ask them a question based on the reading and they need to submit a response before coming to class. This could vary in length. You could ask them for 250 words or a one pager.
- *One Sentence Summary*: This technique can be used at the beginning or the end of class time to summarize, describe, sequence, compare and contrast and show problem/solution. You can read more about one sentence summary [HERE](#).

### Grading Tips

- Allow students to choose 2 of the short-written assessment that they would like graded. This approach would minimize the grading and give students flexibility and ownership over their grades.
- You could use a reduced grading scheme: for example, students receive a + or – on the assessment depending if they have reached the goal of the question or not.

### Benefits

- Help students organize their thoughts
- Allow students opportunities to practice
- Help shy students engage in the classroom conversation
- Help divide the distribution of the grades and feedback throughout the semester
- They help organize thoughts in preparation for class
- Summarize what's occurred in class

### Example

- McGill example [HERE](#)
- Example 2 [HERE](#)

### Classroom Assessment Techniques (CAT)

Classroom assessment techniques are short assessments that could be used during class time. There are multiple types of CAT:

- Course-related knowledge and skills: assess the students' knowledge
- student attitudes, values, and self-awareness: assess the students' attitudes
- Reactions to instruction methods: assess the reaction of the students to the instruction methods

### Benefits

- Allow instructor to gain daily feedback from students
- Give insight to the instructor about what students have learned and what they still need support in
- Allow instructors to address misconceptions in a timely manner
- Creates good relationship between the instructor and the students
- Helps students self-assess and think critically
- Reduce feelings of isolation in the large classroom

### How to use CAT

- Decide what you want to assess
- Choose the appropriate CAT
- Explain the purpose of the activity to the students
- Review the results

- Tell the students what you learned from the CAT and how you will use this information (for example you could tell them a prevalent misconception that you found, or a positive outcome that you noticed) this will help engage the students.

The table in **Appendix A** outlines just some of the possibilities for implementing a Classroom Assessment Technique in your own class.

### Read more

- You can find the 50 CAT handout [HERE](#)
- Muddiest point, one minute paper, chain notes, application articles, and student generated test questions: you can find more information from Iowa State University, Center for Excellence in Learning and Teaching [HERE](#)
- Background Knowledge Probe, What’s the Principle?, Defining Features Matrix [HERE](#)
- Examples of CATs from George Washington University [HERE](#)
- CATs for Science, Technology, Engineering, and Math from the Field-Tested Learning Assessment [HERE](#)
- CAT from Kentucky University [HERE](#)
- [selected\\_CATs.pdf \(umich.edu\)](#)
- [Classroom Assessment Techniques \(CATs\) \(illinois.edu\)](#)
- A tool that helps you determine which CAT to use [HERE](#)
- [Defining Features Matrix \(wisc.edu\)](#)

### Leading Practices

- Start by choosing one CAT
- Conduct a CAT before major assignment/assessment
- Don’t feel obligated to have a CAT every week
- Report your findings to your students
- Create rotation reporting: Short readings submissions could be shared in small groups and one person reports on the submissions and includes all the original submissions as well. As you see in the table below, Student A and student E will be reporting on the submissions of group 1 and 2. Grading in this case in into grading 2 submission instead of grading 8 submissions.
- Make sure you give students specific instructions on what to submit for the rotation. For example, the reporter submits a 500 words synthesis and NOT submit a copy of all the submissions.

Group 1	Student A	Rotation reporter	Week 1 reporter: Student A
	Student B		Week 2 reporter: Student B
	Student C		Week 3 reporter: Student C
	Student D		Week 4 reporter: Student D
Group 2	Student E		Week 4 reporter: Student E
	Student F		Week 4 reporter: Student F

	Student G		Week 4 reporter: Student G
	Student H		Week 4 reporter: Student H

- Consider using self or peer-assessment to provide grading for the short-written assessment. Detailed information about self and peer assessment in the next section.

### iii. Introduce Self and Peer-Assessment

Self- and peer-assessment are two techniques that could be used to allow students to assess their own work and/or their peers’ works. Self-assessment allows students to assess their own work and peer assessment allows students to assess each other’s submissions.

#### Self-assessment

In order to make self-assessment a success, let the students know in advance why you are using this method, create a safe place for them to speak about their learning, and introduce the criteria. Self-assessment can be done with various ways, quantitatively, qualitatively, or descriptively. Finally, you can use a wide range of techniques such as checklists, scripts, templates, rubrics, self-marking, estimating future performance and self-assessment templates.

#### Peer-assessment

Peer assessment, also called peer review, is an instructional approach that allows learners to consider, evaluate, and provide feedback on the level, value, or quality of the intellectual product of an “equalstatus” learner - a peer (Topping, 1998).

Read how Prof. Lawrence Chen from University of Toronto used peer assessment in a class of 500 student [HERE](#)

Read how Prof Joordens from McGill used Peerscholar for peer assessment of 1800 students [HERE](#)

#### Benefits

- Self-evaluation allows students to develop critical reflection
- helps students see work from an assessor’s perspective.
- creates an audience that provides honest feedback and multiple perspectives
- Evaluating peers’ work also exposes students to solutions, strategies, and insights that they otherwise would likely not see

#### Leading Practices

- Provide clear rubrics
- Use calibrated peer assessment: This process allows instructors and TAs to provide training to students before they do the assessment. The training consists of the TAs grading a number of papers with an explanation. Then the students grade the same papers. If the grading is close, then the students move to assessment. If the grades are not close, the students read the explanation and grade other papers. The number of calibrated grading that students do depend on the instructor. You can read more Example of calibrated peer assessment [HERE](#) and you can read more about the use of calibrate peer assessment in engineering in the following two articles:

- Carlson, P. A., & Berry, F. C. (2008). Using computer-mediated peer review in an engineering design course. *IEEE Transactions on Professional Communication*, 51(3), 264-279.
- Saterbak, A., Moturu, A., & Volz, T. (2018). Using a teaching intervention and Calibrated Peer Review™ diagnostics to improve visual communication skills. *Annals of biomedical engineering*, 46(3), 513-524.
- Explain to students why you are involving them
- Develop peer assessment skills before you involve the students in high stake peer assessment
- Make the peer assessment process anonymous

### Equity in Peer and Self-assessment

Some things to keep in mind:

- It is important to foster a culture of assessment. Students with language difficulties or learning difficulties might be challenged by peer assessment exercise. Students from different cultural and educational background might have different approach to peer assessment. They might not value student critique.
- Explain to the students the benefit of divergent views.
- Set up a practice peer assessment activity, could be a group work activity, to allow students to learn from this experience.
- In peer assessment, the instructor/TA takes the role of moderator to protect students from unfair grading

### Examples

- Guide to self-assessment [HERE](#)
- Example of self-assessment tools [HERE](#)
- Self-assessment for group work [HERE](#)
- Read more about how Dr. Steve Joordens, Professor of Psychology from the University of Toronto used peer and self assessment in a class of 1500 students [HERE](#)
- Guide about peer and self-assessment from Ryerson University [HERE](#)

#### iv. Assess Groups Rather Than Individuals

Instead of assessing students individually, you can use presentations, debates, posters, student-generated questions, and videos to assess groups. It is important to introduce the assessment at the beginning of the semester to allow students to get organized and find times that work for all the group members.

#### Leading Practices

- Ask students to submit a project proposal prior to embarking on a large project
- Allow students to give feedback on each others' proposals
- Set up project updates throughout the semester. Allow students to create the type of check-in that works for them which could be a video, an audio, or a written submission.
- Consider assigning a project manager to meet with the instructor and update the instructor on a weekly basis
- You could ask the students for a mandatory weekly meeting and if students miss the meeting, they could fail the assignment. Read more [HERE](#)
- Consider scheduling meetings with each group to talk about the project
- Include peer and self evaluation in the form of a report

- Consider asking students to submit their work on a google doc which allows you to see each person’s contribution

**Benefits**

- Teaching the students valuable communication skills
- Provide some interactivity that facilitates learning

**Examples**

[Group projects in online classes create connections and challenge instructors \(insidehighered.com\)](http://insidehighered.com)

**v. Benefit from the use of Technology**

Technology can be used in a broad way to support the implementation of assessment. In this section we recommend the use of technology to tackle some of the operational and strategic issues of assessment. This is also known as Technology Enhanced Assessment (TEA).

There are several ways to use technology to enhance your assessment:

- Use online marking and annotation (e.g. crowdMark: *Crowdmark is structured so that multiple markers can simultaneously assess a set of exams; each marker can assess entire papers or be assigned specific questions*). You can find more information about Crowdmark [HERE](#) and in a presentation by Tamara Kelly and Hovig Kouyoumdjian from York University [HERE](#).
- Audio and video assessment to allow group work
- Using digital publishing tools in assessment: those are the multiple platforms that could be used to publish content online. They may take the form of wikis, blogs, or social media. These tools allow students to collaborate.
- Immediate response systems
- Polls and mobile devices allow you to create low stake formative assessment and check the understanding of the students.
- Using videos and audio to deliver feedback: an example of this is to use the video and audio options in eClass to deliver your feedback. Feedback could be delivered to every student. Feedback could also be done in one video to the whole class. In tis case, the instructor or the TAs gather common errors and create a video feedback for the whole class to see.

**2. ALTERNATIVE ASSESSMENT YOU COULD USE IN LARGE CLASSROOMS**

<b>Two-staged assessments</b>	This assessment allows you to create a group quiz followed by an individual quiz.
<b>Flexible assessment</b>	This option allows the students to choose the type of assessment they are most comfortable with from a list of assessments that the instructor specifies.
<b>Group Quizzes</b>	Group quizzes could be done in the form of take-home exams or in class exams
<b>Open Book exams/take home exams</b>	In take home exams/Open Book Examination the students are allowed to have access to books, papers and on-line content. Different designs include: a) Ask students to undertake a take-home exam that the instructor designs or b) Ask the students to design an open book exam

## Two-Staged Assessment

### Description

Two-stage collaborative assessment is a platform that provides the opportunity for students to cooperatively take assessments. It is also known as two-stage exams, tiered exams, pyramid exams, group quizzes, collaborative testing, cooperative exams, and team-based tests (read more [HERE](#)).

How does it work:

- Before the test/exam, encourage students to study with a partner or in a small group
- During the test administration, students work with their partners or group members and discuss the test questions one-by-one
- After the group is satisfied with the conversation, each member selects and records their own response.
- Students do not need to provide one answer per group. Each student can have their own answer. Students' answers don't need to be the same.

### Benefits

- Research shows that team tests help students learn.
- Feedback. Especially in large classes, re-doing the test immediately with peers allows students to get to immediately discuss the questions and come to the right answer.
- Exam improvement.
- Community building
- Facilitates inclusion (click [HERE](#) to read more)

### Examples

- Video about Two-staged exam [HERE](#)
- Example from Tamara Kelly Biology Department, York University [HERE](#)
- Physics and electrical engineering example [HERE](#) (160 students)
- [Video 2: Two-stage midterm exam | Evidence-based science education in action: \(ubc.ca\)](#) (300 students)
- Dr Catherine Rawn's blog outlines a simple procedure in Psychology [HERE](#)
- The positive responses of both teachers and students in an introductory physics course [HERE](#).

### Rubric

Examples of rubrics are: Rubric for assessing students' collaborative skills, Checklist for self-assessment, Checklist for peer assessment, and Rubric for assessing teamwork

A rubric for teamwork from Rochester Institute of Technology [HERE](#)

### Resources

- Tips for Successful Two Stage Exams [HERE](#)
- Tips on what to do on the day of the exam, during the exam, and after the exam [HERE](#)
- Multiple assessment tools could be used in the two-stage collaborative assessment [HERE](#)
- Collaborative assessment [HERE](#)
- Two-stage exams [HERE](#), [HERE](#), and [HERE](#)
- [Two-Stage Exams \(ubc.ca\)](#)

## Flexible Assessment (Example from UBC – 280 students)

[Dr. Candice Rideout](#) explained how she used flexible assessment in a large classroom. Allow the students to choose the value assigned to each of the assessments. Providing students with the

opportunity to select which assessments they will complete (and the value each will contribute to their final grade). Dr. Rideout gave the students a table with a proposed grading schema and a column for the students to choose their preferred grading schema. For each of the assessment, Dr. Rideout gave the students a range to choose from for example 0 to 35%.

**Leading Practices**

- Set a deadline by which students can choose the grade distribution
- Give the students a range they can choose from

**Example**

Check out Dr, Rideout’s publication to know more about the different assessment schemes: Rideout, C. A. (2018). Students’ choices and achievement in large undergraduate classes using a novel flexible assessment approach. *Assessment and Evaluation in Higher Education*, 43(1), 68-78. <https://doi.org/10.1080/02602938.2017.1294144>

**Group/Pair quizzes (example from .... 60 students)**

There are a variety of ways to use group or pair quizzes. Group/pair quizzes could be completed as a take home exam or in the classroom.

Take home exams should be challenging to avoid the divide and conquer approach. Instructors should choose questions that require negotiation among the students to reach consensus backed by resources. Take home exams could also be followed by individual in class exams. In class exams need to complement the take home exam in way that a student who hasn’t contributed to the take home exam is not able to successfully complete the in-class exam.

**Take home exams/open book exams**

In take home exams/Open Book Examination the students are allowed to have access to books, papers and on-line content. Different designs include a) Ask students to undertake a take-home exam that the instructor designs or b) Ask the students to design an open book exam.

You can watch this webinar provided by the Teaching Commons [HERE](#) and this clip [HERE](#)

**Benefits**

- Allows for assessment of higher order learning (e.g., application, analysis, evaluation, creation)
- Develops information literacy skills
- Mimics actual professional activities where students can have access to information
- Less anxiety provoking for some students

The Teaching and Learning Center at Newcastle University, Australia provided the example of questions in the table below. Questions are divided into Socratic questions and Bloom’s Taxonomy questions [HERE](#).

Socratic Questions:

Type of question	Example
Clarification questions	What do you think is the main issue? Could you provide an example?
Assumption questions	What would lead someone to make that assumption?
Reason and evidence questions	Can you provide a reason to doubt that belief?
Origin or source questions	What is your main source of information? What impacted your viewpoint?
Implications and consequence questions	Specify other consequences that might happen because of this incident?

Viewpoint questions	How would other groups of people perceive this question and why?
---------------------	--

Bloom’s Taxonomy Questions:

Type of question	Example
Knowing and remembering	List? Describe? Define? What? When? How?
Understanding	Explain how ... Give an example of ...
Applying	How would you use? How would you solve?
Analyzing	Compare/contrast? Relationship?
Evaluating	What is the strongest argument?
Creating	What changes would you make? How would you evaluate?

Adapted from “A Guide for Academics – Open Book Exams” from the University of Newcastle:

[https://www.newcastle.edu.au/\\_data/assets/pdf\\_file/0006/268980/Open-BookExams.pdf?fbclid=IwAR2NIKERdF5Tug6XugJgLbtGpmhx7PJ3pExkmCJTrF3uVc15N7ixL91Q9JU](https://www.newcastle.edu.au/_data/assets/pdf_file/0006/268980/Open-BookExams.pdf?fbclid=IwAR2NIKERdF5Tug6XugJgLbtGpmhx7PJ3pExkmCJTrF3uVc15N7ixL91Q9JU)

### Examples

Take home example [HERE](#)

Example from 4000-level Interdisciplinary Medical Sciences from Dr. Nicole Campbell at UWO [HERE](#)

Math example [HERE](#)

Health faculty example [HERE](#)

### Rubric

Example of a rubric for a take home exam [HERE](#)

### Leading Practices

If you create 20 questions and 4 essays and every student gets 3 question and 1 essay, this minimizes the chance of students getting the same combination.

Other examples include:

- [How to have students submit handwritten work in an online setting \(rtalbert.org\)](#)
- [Modifying-closed-book-exams-for-use-as-open-book-exams.pdf \(kevinhouston.net\)](#)
- [Mathematics Take Away Open Book Assessment | Kevin Houston](#)
- [Appen\\_repurposing\\_face2face.pdf \(tcd.ie\)](#)
- [Designing\\_openbook\\_exams\\_F.pdf \(tcd.ie\)](#)
- [Creating authentic assessments: A method for the authoring of open book open web examinations \(qut.edu.au\)](#)

### Resources

#### Guides & Articles

- A guide to prepare Open Book Exams from Trent University [HERE](#)
- [Open-Book-Exams.pdf \(newcastle.edu.au\)](#)
- Public Service Commission of Canada. (2015). Best practices for unsupervised testing [HERE](#)
- Resources from University of Western Ontario [HERE](#)

- How to transition to take home exams [HERE](#)
- [https://www.newcastle.edu.au/\\_data/assets/pdf\\_file/0006/268980/Open-Book-Exams.pdf](https://www.newcastle.edu.au/_data/assets/pdf_file/0006/268980/Open-Book-Exams.pdf)

### 3. GENERAL ADVICE

- Develop joint assessment with another subject in the course – this may help to link concepts and develop coherent as well as lessen the load
- Build assessment tasks into learning activities rather than as add-ons
- Have the students do some kind of active learning assignment that they turn in after every class, but only grade a small subset of these assignments.
- Check the assignments before the next lecture so that you can address common misconceptions.
- You could also use the ungraded assignments to check attendance randomly throughout the semester.
- Establish a Student management team (see below) that can provide feedback on the general perception of the difficulty and fairness of the exam.

### 4. TIPS FOR MANAGING GRADING FOR A LARGE CLASSROOM

- Simple Grading system for shorter assignments: a three-to-five-point scale, with specific pieces of information required for each point or a check/check-minus/check-plus system
- Detailed grading rubric for papers and other assignments
- If using group or peer-based work,ask students to fill a report on their own performance and that of their colleagues. Knowing they'll be evaluated this way keeps online students engaged when they might be tempted to drift.

### 5. TIPS FOR MANAGING FEEDBACK FOR LARGE CLASSROOM

- Ask students (in small groups) to take turns at moderating a feedback forum where students can ask topic-related questions.
- Model answers: Provide a list of the most common and typical problems in assignment submissions and examination along with explanations and model answers. This helps students understand the mistakes that were often made by previous students. Provide model answers, including examples of very good, moderate, and poor assignments/exam answer

### Recommended readings

- [Assessing large numbers of students - Engage in Assessment - University of Reading](#)
- [© 2001, Schreyer Institute for Innovation in Learning 1 \(psu.edu\)](#)
- [LCT-Peer-and-Self-Assessment.pdf \(utoronto.ca\)](#)
- [Self-assessment - Engage in Assessment - University of Reading](#)
- Kerr, A. (2011). Teaching and Learning in Large Classes at Ontario Universities: An Exploratory Study. Toronto: Higher Education Quality Council of Ontario
- Topping, K. (1998). Peer Assessment Between Students in Colleges and Universities. Review of Educational Research, 68(3), 249 -276.
- [Do THIS, Not THAT When Writing Multiple-Choice Questions - eLearning Industry](#)
- [Designing Multiple-Choice Questions | Centre for Teaching Excellence | University of Waterloo \(uwaterloo.ca\)](#)
- [Writing Good Multiple Choice Test Questions | Center for Teaching | Vanderbilt University](#)
- [Microsoft Word - Handouts - 14 Rules for Writing Multiple-Choice Questions.. \(byu.edu\)](#)
- ["Chapter 02: Learning from the Test: Dos and Don'ts for Using Multiple-" by Elizabeth J. Marsh and Allison D. Cantor \(wustl.edu\)](#)
- [Student Peer Assessment | UNSW Teaching Staff Gateway](#)

## 6. APPENDICES

## Appendix A: Examples of CATs

Name	What is it	Time needed
1. Muddiest Point  <b>Individual</b>	Ask the students what they did not understand and what might help them understand.	Prep time: Low In-class time: Low Evaluation time: Low
2. One Minute Paper  <b>Individual</b>	At the end of class time, ask students to fill an eClass quiz answering the following question: “Most important thing I learned today and what I understood least.”	Prep time: Low In-class time: Low Evaluation time: Low
3. Chain Notes  <b>Individual</b>	Create a discussion board thread and ask students to answer the same thread	Prep time: Low In-class time: Low Evaluation time: Medium
4. Application Articles  <b>Individual/in Groups</b>	Ask students to write a short news article about how a major point applies to a real-world situation/ or applies to their major	Prep time: Low In-class time: Medium Evaluation time: Medium
5. Student Generated Test Questions  <b>Individual/ In Groups</b>	Ask students to write test questions and model answers.  In groups: Divide the class into groups and ask them to write a question and model answer for the exam or assign a topic to each group and ask them to write a question and a model answer	Prep time: Low Application time: Medium Evaluation time: Medium

<p>6. The Minute Paper</p> <p><b>Individual</b></p>	<p>Asking students to write a brief response to the following questions:</p> <ul style="list-style-type: none"> <li>• “What was the most important thing you learned during this class?”</li> <li>• “What important question remains unanswered?”</li> </ul>	<p>Prep time: Low Application time: Low Evaluation time: Low</p>																
<p>7. The Background Knowledge Probe</p> <p><b>Individual</b></p>	<p>Give the students a short questionnaire before the introduction of a new unit, lesson or topic to uncover what they know about the topic.</p>	<p>Prep time: Low Application time: Medium Evaluation time: Medium</p>																
<p>8. What’s the Principle?</p> <p><b>Individual/ In Groups</b></p>	<p>Provide students with a problem and asks them to state the principle learned in the course that best applies to each problem.</p>	<p>Prep time: Low Application time: Low Evaluation time: Low</p>																
<p>9. Defining Features Matrix</p> <p><b>Individual/ In Groups</b></p>	<p>Prepare a handout with a matrix of multiple columns and several rows. At the top of the first two columns, list concepts that have potentially confusing similarities, list the features in the rows. Ask the students to put a (+) if the concept has the feature and a (-) if the concept doesn’t have the feature. Example below.</p> <table border="1" data-bbox="496 1369 1141 1644"> <thead> <tr> <th></th> <th>Concept A</th> <th>Concept B</th> <th>Concept C</th> </tr> </thead> <tbody> <tr> <th>Feature X</th> <td>+</td> <td>-</td> <td>-</td> </tr> <tr> <th>Feature Y</th> <td>+</td> <td>-</td> <td>+</td> </tr> <tr> <th>Feature Z</th> <td>-</td> <td>+</td> <td>+</td> </tr> </tbody> </table>		Concept A	Concept B	Concept C	Feature X	+	-	-	Feature Y	+	-	+	Feature Z	-	+	+	<p>Prep time: Low Application time: Low Evaluation time: Low</p>
	Concept A	Concept B	Concept C															
Feature X	+	-	-															
Feature Y	+	-	+															
Feature Z	-	+	+															
<p>10. Focused Listing</p> <p><b>Individual/ In Groups</b></p>	<p>Ask the students to list ideas related to the “focus”</p>	<p>Prep time: Low Application time: Low Evaluation time: Low</p>																

<p>11. Empty Outlines</p> <p><b>Individual/ In Groups</b></p>	<p>Ask students to complete an empty or partially completed outline of a class presentation</p> <p>Example below.</p> <table border="1" data-bbox="500 331 1141 751"> <tr> <td><b>General Topic:</b></td> <td></td> </tr> <tr> <td><b>Specific Topic:</b></td> <td></td> </tr> <tr> <td><b>First main point:</b></td> <td></td> </tr> <tr> <td><b>First main point example:</b></td> <td></td> </tr> <tr> <td><b>Second main point:</b></td> <td></td> </tr> <tr> <td><b>Second main point example:</b></td> <td></td> </tr> <tr> <td><b>Conclusion</b></td> <td></td> </tr> </table>	<b>General Topic:</b>		<b>Specific Topic:</b>		<b>First main point:</b>		<b>First main point example:</b>		<b>Second main point:</b>		<b>Second main point example:</b>		<b>Conclusion</b>		<p>Prep time: Low</p> <p>Application time: Medium</p> <p>Evaluation time: Medium</p>
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<b>Conclusion</b>																
<p>12. Memory Matrix</p> <p><b>Individual/ In Groups</b></p>	<p>Ask students to complete a table about course content. You provide the headings, and they fill the cells.</p> <table border="1" data-bbox="500 892 1179 1129"> <thead> <tr> <th></th> <th><b>Application</b></th> <th><b>Countereffects</b></th> <th><b>Exclusion</b></th> </tr> </thead> <tbody> <tr> <td><b>Medicine 1</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Medicine 2</b></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		<b>Application</b>	<b>Countereffects</b>	<b>Exclusion</b>	<b>Medicine 1</b>				<b>Medicine 2</b>				<p>Prep time: Low</p> <p>Application time: Medium</p> <p>Evaluation time: Medium</p>		
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<b>Medicine 1</b>																
<b>Medicine 2</b>																
<p>13. Pro and Con Grid</p> <p><b>Individual/ In Groups</b></p>	<p>Students list pros/cons, costs/benefits, advantages/disadvantages of an issue, question, or claim</p>	<p>Prep time: Low</p> <p>Application time: Medium</p> <p>Evaluation time: Medium</p>														
<p>14. Approximate Analogies</p> <p><b>Individual/ In Groups</b></p>	<p>Ask students to complete the 2nd half of an analogy: Element A is to Element B as ? is to ?</p>	<p>Prep time: Low</p> <p>Application time: Low</p> <p>Evaluation time: Low</p>														
<p>15. Concept Maps</p> <p><b>Individual/ In Groups</b></p>	<p>Ask students draw the connections they make between a major concept and other concepts</p> <p>Or give the students a half blank concept map and ask them to fill the rest</p> <p>TIP: prepare the concept map in advance</p>	<p>Prep time: Low</p> <p>Application time: Medium</p> <p>Evaluation time: Medium</p>														

<p>16. Invented Dialogues</p> <p><b>Individual/ In Groups</b></p>	<p>Ask students to structure conversations between historical figures about a topic.</p> <p>Ask them to support their claims with quotes from the course.</p>	<p>Prep time: Low</p> <p>Application time: Medium</p> <p>Evaluation time: Medium</p>
<p>17. Problem Recognition Tasks</p> <p><b>Individual/ In Groups</b></p>	<p>Provide the students with a list of problems</p> <p>Ask them to determine which method is used to solve the problem (without solving the problem)</p>	<p>Prep time: Low</p> <p>Application time: Low to Medium</p> <p>Evaluation time: Medium</p>
<p>18. Application Cards</p> <p><b>Individual/ In Groups</b></p>	<p>Ask students to identify one real world problem where the topic discussed in the class can be applied</p>	<p>Prep time: Low</p> <p>Application time: Low</p> <p>Evaluation time: Low</p>