

## Preclass-Reading Assignments

### Why they may be the most important homework for your students

By Cynthia Heiner and Georg Rieger (with input from Carl Wieman, Sarah Gilbert, and Louis Deslauriers)

We usually think of homework as a task, such as a problem set, in which students apply what they have learned in class. But homework can prepare students to learn in future classes. Here we discuss the benefits of pre-reading assignments, report on what students think about pre-reading, and give tips on how best to implement pre-reading assignments to make them effective.

### What are pre-reading assignments and what are their benefits?

Traditionally, students are first introduced to a topic in lecture; however, students can read the textbook before coming to class and complete a short quiz on the reading. This is a pre-reading assignment. The first benefit of such assignments is that students will get more out of class if they already know the basic definitions and vocabulary, as well as having already had the chance to work through simple examples and think about concepts at their own pace. This helps control for the variability in background knowledge of the students, and students regularly mention in surveys that pre-reading helps them follow what is covered in class. Also, Louis Deslauriers has monitored the student questions in lectures and noted that student questions are on a cognitively higher level in weeks with pre-reading assignments compared to those in weeks without. Second, by looking at the average responses to pre-reading quiz questions or by directly asking your students what was difficult in the pre-reading assignment, you can gain insight as to which topics your students find difficult. Third, you don't have to spend (much) time on definitions or low-level examples, so you have more class time to focus on the more challenging material.

### What students think about pre-reading assignments

Assigning reading is not new. However, in science classes students often do not read the assigned text on a regular basis. So what is different with our pre-reading approach? The assigned readings directly target material used, but not repeated, in upcoming classes and are coupled with targeted quiz questions. This leads students to recognize the textbook as being helpful to their learning.

Typically, 85% of students report that they read the assigned text every week or nearly every week when the pre-reading assignments are implemented as described here. This has been true across numerous courses spanning several science disciplines. Slightly higher numbers report completing the online quiz (for which self-reports match closely to the computer record). When asked what motivated them to do the pre-readings, the most frequent single answer was the contribution to their grade, but more than half the students said it was because they found the pre-readings 'helpful for understanding the material', and 'to know what to expect in lectures'.

Examples of student comments:

Student A: *"I know that if I complete the pre-reading I will better understand what is going on in the lecture as well as I can figure out where I need to pay the most attention and potentially ask questions."*

Student B: *"I think this forced me to think and was very beneficial to start off the week as I would come into class knowing what to expect and what was expected of me."*

Student C: *"To be honest, I did so because it was for marks. After a while, I didn't mind reading it; and the questions on the pre-reading quizzes help me understand some of the concepts."*

### How to implement pre-reading assignments

The pre-reading approach is a variant on "Just-In-Time-Teaching" (JITT<sup>1</sup>), in which every class is preceded by a pre-reading assignment and a quiz with open-ended questions about the difficulties encountered. The instructor reacts to these postings by adjusting the lecture to discuss the difficulties "just in time" for the next class. The full JITT approach requires a strict timetable for the students and the instructor, which is challenging to implement in many courses, particularly ones with large enrollments, and/or multiple sections.

Here we offer a ‘softer’ approach to JITT that provides many of the same benefits. The students get a weekly pre-reading assignment to complete over the weekend, preparing them for the next week of classes. There is a quiz on the reading due before class. There are three key components for the successful implementation of pre-reading assignments: (1) the reading is very specific, (2) the quiz questions explicitly refer to the textbook, and (3) the instructor does not begin class by repeating much of the material in the assigned reading.<sup>ii</sup>

### Best practices

1. The assignment should focus on what you plan to discuss in class. This creates a clear connection between the reading and the expectations of the students for class.
2. Omit everything that is not necessary. The shorter the assignment is, the more likely the students will actually read it and focus on the key material. Some instructors believe in longer, less focused, readings from which the students are expected to extract the relevant material. This is an unrealistic expectation for a first exposure to the material.
3. The reading should be guided with explicit prompts for the students of what to look for while reading.
4. Give a reading quiz for marks. By assigning marks, you are telling your students that this assignment is important, even if the actual numerical value is small. We have seen that weightings of between 2% and 5% of the course grade achieve similar ~85% reading completion rates, while assignments without associated marks have much lower completion rates.
5. The questions on the quiz should force the students to read the sections you want them to read and concentrate on the figures that are rich with information. By referring to specific figure numbers, (or equations, etc.) in the textbook, students must at least open the textbook to be able to answer the question.
6. Refer in class to things from the pre-reading– but **do not** re-teach them. The point of pre-reading is that the students are expected to come to class prepared with some knowledge. If you re-teach it all, the students will quickly realize that pre-reading is a waste of time and stop doing it. Explain the purpose of pre-reading in your first class and stick with the approach.
7. While there are various quiz options, we have found that a multiple-choice online quiz is better than a paper or clicker-based in-class quiz. In addition to saving precious class time, having the students do the assignment at home with their textbooks open lets them review – before class – their mistakes (and at their own pace). A reading quiz is not a pop quiz -- the idea is to prepare students and not to surprise them. Pre-reading assignments should take less than an hour, with the quiz portion, typically around 5 questions, taking no more than 10-15 minutes of that time. Use mostly questions that all students could answer with the book, but add in a few that require a little more “reading between the lines”. Don’t forget: your goal is to draw their attention to something in particular and to motivate, not to trick or overly burden them during their first exposure to the material.
8. It is important that the students understand why and how the pre-reading will be beneficial to them. Explicitly explain your rationale and expectations. On the one hand, you expect the students to read the text and try hard to answer the quiz correctly. On the other hand, you do not expect them to “teach themselves” the material nor understand it all completely from the textbook alone. This first exposure gets them started and helps reveal the trouble spots to both the students and the instructor. It is worth repeating the benefits of pre-reading to your students a couple of times during the term.

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<sup>i</sup> C. H. Crouch, E. Mazur, *Am. J. Phys.* 69, p. 970 (2001)

<sup>ii</sup> Preparing students for class: How to get 80% of students reading the textbook before class, Cynthia Heiner, Amanda Banet, and Carl Wieman, *Amer. J. Physics* 82(10), 989 (2014); doi: 10.1119/1.4895008  
[http://cwsei.ubc.ca/SEI\\_research/files/Heiner-Banet-Wieman\\_Pre-Reading\\_AJP2014.pdf](http://cwsei.ubc.ca/SEI_research/files/Heiner-Banet-Wieman_Pre-Reading_AJP2014.pdf)