

The Qualifying Exam

The qualifying exam is the first major milestone in pursuing a PhD. Despite the apparent difficulty of this process, it can be an enjoyable learning experience. The best way to make the process easier is to be prepared. The following advice is intended to provide some answers to common questions regarding what to think about when finding a committee, balancing other responsibilities, preparing for the exam and doing the exam.

Pre-qualifying considerations:

When should you qualify?

Officially, you need to qualify by May of your second year. Most people qualify in the fall or spring of their second year, although some students may opt to start earlier (summer before the 2nd year). Occasionally, students can receive special permission to delay qualifying until the summer after the 2nd year, but this is generally discouraged. The decision of when to qualify should be made on an individual basis (in consultation with your advisor), and should take into account a number of considerations, including the availability of you and your committee members, how prepared you are, what stage in lab work you'll be in, etc. Here are some relative advantages and disadvantages to qualifying at various times of the year.

⚙ Summer before 2nd year:

Few students feel ready to begin qualifying at this point, but for those who do, qualifying early can be a very appealing option. The biggest advantage to qualifying over the summer is lack of distractions. There are no classes to take away from reading time, and students are usually not settled into a lab enough to have pressing ongoing research that needs to take priority. If you want to have a shorter, more intensive qualifying experience, qualifying over the summer may be a good option, allowing you to focus almost entirely on the qualifying experience, which could be completed in as little as 6 weeks. Because there are no classes, you may find faculty more or less willing and available to meet with you. Some faculty will have more time over the summer and prefer meeting then, whereas others prefer to reserve their summers for vacation time or non-departmental commitments. The only way to know is to ask. Be prepared for the fact that some faculty may not be available for large chunks of the summer, and scheduling the actual exam for a summer date may be difficult, since you might be less likely to get all of your committee in one place at one time. If this proves to be problematic, you could always do your reading period over the summer, and take the exams at the very beginning of fall semester, when everyone should be in town.

Generally speaking, it is possible to qualify the summer before your second year, and it can be very appealing to get your qualifying over with when you can really focus on it, and then be able to focus on research and courses the rest of the year while your fellow students stress over managing everything. However, it does require an added degree of

organization and early planning, and most students do not feel ready to embark on this process this early on, preferring to use the second year to gain more knowledge and expertise before qualifying.

Bottom line -- if you feel like you would probably do better a better job if you waited, you should probably wait until fall or spring.

◆ Fall or Spring of 2nd year:

All faculty should be in town during the semester, but if they have a heavy teaching load, they may find it difficult to make time to meet. Again, this will vary person to person, so you just have to ask. As far as your own availability, you do have some degree of control over this your second year. You will need to take a few courses and/or TA, but it's possible to plan ahead and try to take a lighter (or no) load the semester you plan to qualify. If you figure out ahead of time when you want to qualify, you should also be able to plan your research to a certain extent so as to minimize the stresses of juggling multiple deadlines while trying to qualify.

Differences between Fall and Spring are usually specific to the individual student, and should be discussed with your advisor. One thing to be aware of if you want to qualify in the fall is that winter holidays can approach fast. If you're planning on taking the exams in December, you may want to check with your faculty well ahead of time to see if they'll all be in town at the same time. Otherwise, you might be left in a situation where you can't find a date that works for everyone, and you have to wait until January to take the exams, even if you've long finished the reading period. Similarly, if you wait to qualify until late spring, you may find yourself in a situation where several students are trying to qualify last minute and read with the same faculty, which could also interfere with your plans. Also keep in mind that second-years are usually scheduled to give their Student Research Talk in the late spring, and the deadline for Society for Neuroscience Abstracts are also around that time, so you may want to plan around these.

Bottom line -- there's a lot of flexibility here, but don't assume all of your faculty are on the same page; talk to them about when you would like to read and when you would like to take the exams before you start.

❄ Winter of 2nd year:

As mentioned above, do not expect faculty members to be available to meet with you from mid-December through early January. However, if you want to get a head start on reading over break when there are less distractions, you could consider having a pre-reading meeting with each of your faculty members early in December to set your reading lists, and use winter break to get started on your articles. This might be a good option if you want to finish qualifying earlier in spring semester, well before finals, deadlines for meeting abstracts, etc.

☀ Summer after 2nd year:

Technically, you should be finished qualifying by the end of May. If you have special circumstances and need to discuss the possibility of an extension, you should talk to Carol about this well ahead of time.

Q: How do you choose faculty?

A: Choosing who to qualify with can be a difficult decision. A good start would be to make a list of all the possible people you could see yourself qualifying with. Then you could meet with your advisor to cut down the list to your top 4, plus a few alternates in case someone isn't available. When thinking about who to ask, keep in mind that qualifying should be a learning experience, so select people who you think you will be able to really learn from. You are required to select faculty members from at least 2 different departments, but beyond that, there is great variety in the amount of diversity people choose to include in their committee. Some students prefer to choose faculty members directly related to their own research interests, treating it as an opportunity to start learning the literature for their thesis research, or getting to know faculty members they may want to collaborate with. You also may want to consider faculty members who could directly benefit your own research--a person on your qualifying committee could also be a thesis committee member. Other students prefer to select faculty members with research interests very different from their own, treating qualifying as an opportunity to intimately learn about something they might not be exposed to otherwise. It's often a good idea to try to strike a balance between these two approaches. Remember, the faculty you'll be reading with are often world-renowned experts in their field -- think about who you'd most like to get to know and what research you'd most like to learn about from them.

Q: Should you qualify with your PI?

A: Some students read with their PI, others don't. Either is perfectly acceptable. Often this depends on your relationship with your PI. If you regularly meet with your PI and discuss articles and such already, then you may prefer to take the opportunity to read with as many other faculty as possible. On the other hand, if you come from a large lab where it's more difficult to get face time with your PI, or you simply haven't had the opportunity to go over relevant literature with him/her yet, it may be worthwhile to take the opportunity to read with him/her during qualifying. Sometimes PI's have very strong opinions one way or the other about reading with their own students, so you should always discuss this with your advisor early on. Some students also opt not to read with their PI to reserve him/her for a "just in case" situation -- occasionally, for one reason or another, a faculty member you've been planning on reading with might not work out, and some students like having their advisor available as a safety net in case they need to find a last minute replacement.

Q: When should you contact faculty?

A: The simple answer is as early as possible (especially if you are considering qualifying the summer before second-year). Be respectful of the fact that faculty are extremely busy and have numerous responsibilities. Don't contact them in April with a last-minute "I need to qualify by the end of next month can you start reading with me tomorrow?" request. This rarely goes over well. Remember, these are not only the people you'll be reading with, they're also the people who will be examining you -- if their first impression of you is a student who is disorganized, last-minute, and not taking it seriously, it may be difficult to change their minds come exam time. Additionally, some faculty members are more popular than others, and they may not be able to read with everyone who asks. So if you have certain faculty members you'd really like to read with, it's not a bad idea to informally contact them up to several months ahead of time to see if they might be interested. Then, when it gets closer (perhaps a month or so before you'd like to start) and you iron out your final list, you can officially contact everyone on your list. It's also not a bad idea to set up a pre-reading meeting with each faculty member before you'd like to start reading. That way you can discuss things like timeframes and reading topics before you officially commit to reading with each other.

During qualifying:

Q: How often do you meet?

A: This varies depending on the professor. Some may travel, teach, or be tied up by administrative tasks while you're reading with them. In that case, you may be limited to 4-6 total meetings. You may also be limited to meeting only once every two weeks. It would be a good idea to avoid large gaps of time (i.e. no more than three weeks) between meetings. Other faculty will be more available and could meet once per week and have up to 8 total meetings. The length of each meeting can also vary and it can range from 1 hour to 2 hours. The people that had fewer total meetings compensated by having generally longer meeting sessions.

Q: How many people at a time?

A: It's possible to meet with all four faculty members during the reading period. Potential conflicts can be avoided by having an assigned day for each faculty member and keeping arranged meetings at no more than two faculty per week if possible. Other students have staggered their meetings such that they finish some sessions with one faculty member before starting their meetings with another.

Q: What are your options for choosing reading lists?

A: Again, this varies depending on the faculty member. Some are happy to search PubMed and provide a list from the very beginning of the reading period. With others, there may be more of a dialogue between the student and faculty member when selecting, but if you can, insist on setting a list as early as possible—it will help you and the faculty member plan. Nevertheless, you may

also choose to read a field that is very young, precluding a pre-arranged reading list. It's not unheard of to read papers that were published for mere days. Whatever the method for choosing a reading list, it is highly recommend you define the reading list with the faculty member once the reading period is over. This should be done for several reasons. First, some papers may be preferred more than others. This could happen when both you and the faculty member decide that certain papers were weaker than others and you decide to scratch them off your list. Second, defining the reading list also makes it clear to you and the faculty member which papers are "fair game" for the exam. This can help you focus your efforts, which will be needed when you may need to know up to 60 papers for qualifying!

Q: How do you prepare for a meeting/what is expected of you?

A: Treat the reading period as a time to spend quality one-on-one time discussing cool studies with a faculty member that is knowledgeable in that field. And while it's always a good idea to have fun and enjoy the meetings, keep in mind that they're assessing you with each meeting. Also remember to be respectful of their time. They are being good citizens of the INP but just remember that they have busy schedules to and they could have easily said "no" to your qualifying request. Take the time you have with them seriously. Plus, you may want this person to be on your thesis committee! Don't blow a chance at developing a potentially useful relationship.

As for what you should know specifically, you should have a thorough understanding of the paper. This is not a situation where you can just read the abstract and gloss over the figures. Usually every word of the text and you never know what they'll ask you about. You will see that some faculty will tend to vary in what they ask during meetings. Some will focus only on the paper at hand and will just want to ensure that you know the main questions, have a general understanding of the pitfalls and strengths of techniques, and grasp the results. Others will be more "big picture" and ask you to speculate on the next questions that stem from the results of a paper and papers that were discussed previously.

At the same time, while you know the main points of the paper, remember that you don't have to demonstrate everything you know. After all, you're meeting with an expert in the field. Allow him or her teach you.

The qualifying exam:

Q: What is the format of the exam?

A: The format of the exam varies depending on if the student is in the INP or the Neurobiology Department. Briefly, the exam has a two day written and an approximately two hour oral component, in which the student can be asked questions with a huge range of scope, from very specific to very global. The technical details of the exam are well explained in the official Neuroscience Handbook; see pages 13, 19 and 20 for more

information.

Q: INP vs. Neurobiology?

A: Students in a Department of Neurobiology laboratory may be able to choose which format of qualifying exam they take - if this is the case, the student must consider which nuances of the two formats suit them best. For instance, in the INP version, the student can complete the written exam in the location of their choice whereas in the Neurobiology version, the location is selected by the Department. Additionally, in the INP version, the student has 48 hours to use at their discretion to answer a total of three written questions, whereas in the Neurobiology format, the student has 6 hours each day for two days to answer two questions per day.

Q: How should I prepare for the written exam?

A: This is very much up to the student, particularly as the written component is open-book. Many students incorporate at least a few days between their last reading meeting and the beginning of the exam and typically spend the time looking at the papers they have read again and in particular those read in early meetings. Going back through any notes taken during the reading meetings is also a popular activity. Many students also spend time making sure that any common themes running through the papers assigned by a committee member are identified and understood.

Q: Where can I take the written exam?

A: INP students are permitted to take the written exam in a location of their choice - exactly where depends on where the student feels most comfortable and least likely to be distracted. Consequently, many students take the exam at home, though the library and their lab desk are also common choices.

Q: Are there 'tactics' for the written exam?

A: While Neurobiology students have to answer one question from each committee member in the written exam, INP students only answer questions from three of the four. Consequently, it is often said that the committee member who does not receive a written exam answer is then given priority to ask questions first in the INP oral exam and that students should select written questions based on which committee member they feel they will be best able to answer oral questions from. **THIS IS NOT A RULE AND DOES NOT APPLY TO EVERY STUDENT.** Which members of the committee received a written answer may not be a factor in determining who asks the first question(s) in the oral exam. It is also often said that the unanswered questions from the written exam become questions for the oral exam and that students should select the questions they answer in the written component with this in mind. **THIS IS ALSO NOT A RULE** - it is equally likely that a committee member will ask about their written answer in the oral exam.

Q: How should I prepare for the oral exam?

A: In general, the oral component of the qualifying exam occurs within one week of the written exam, so students have a few days of preparation time. Again, exactly what form the preparation takes is dependent on the student; some students re-read the papers and their notes again, others spend time going back through their written answers and thinking about how they might have answered the questions they omitted and, if in the INP, the questions from the committee member they omitted in particular. Some students also find that spending time in lab during this period can be quite refreshing! Indeed, it is quite likely that the student will have had little social contact both just before and during the 48 hour written component, so some socializing could be good relaxation before the oral exam. If nothing else, time in lab also gives the student an opportunity to verbally discuss science again!

Q: What should I expect in the oral exam?

A: While the specifics of the oral exam will vary depending on the student and the committee, in general, the exam can last up to two hours and will involve each member of the committee asking questions of the student in an order determined at the beginning of the exam. The scope of the questions can vary hugely, some leading to a discrete answer and others which may lead to an open-ended discussion, potentially involving other members of the committee. A blackboard will be provided for the student to use to better illustrate any answer they choose - spending some time practicing drawing on a blackboard before the oral exam may be useful! In addition to illustrations, some students also use time at the blackboard to compose their thoughts while they have their back turned to the committee during the exam and to write key words as reminders for use when they give an answer.

Q: Is there anything else I should know about the qualifying exam?

A: The qualifying exam is assessed based on the student's performance in the reading meetings with their committee and both the written and oral components of the exam. As such, if the student has proven that they have a good grasp of the assigned papers in their meetings and through their written answers, the oral exam may prove to be a quite enjoyable discussion. It should also be noted that the student is not expected to be able to recall every single fact they have learned during the qualifying process in the oral exam - 'I don't know' is a perfectly acceptable answer and will lead to prompting from the committee, rather than trying to make something up, which will be looked upon less favorably.

Lab expectations/outside responsibilities while preparing for the exam:

Q: How much time should I expect to spend in lab while I am reading and preparing for the exam?

A: Preparing for the exam should be your main priority during the period in which you have decided to read and qualify. However, your presence in lab is expected. You and your PI should discuss what is expected and what is feasible during this

time, and also know that depending on what time of year (summer, fall, or spring) that you qualify, other responsibilities may also prohibit consistent lab work (see Second year responsibilities). Despite these expectations, PI's who are familiar with the system will generally understand of the time required to go to meetings and prepare for them, as well as study for the exam. Letting them know about your schedule and the time period of your qualifying exam will help them in gauging how much can be expected in terms of lab progress during this time. How many experiments you get done or lab time you log depends greatly on your work habits and scheduling. For PI's that are unfamiliar or new to the system, it would be a good idea to talk about what the process will be, and to explain how it may take time away from lab work. Bottom line, you should show up to lab, participate when possible, and try to schedule reading with faculty around lab meetings or other lab responsibilities that you know you are required to attend.

Q: Should I take a class the semester I qualify?

A: Depending on your qualifying schedule, if it is compact or spread out, you may be able to take a class. As before, you should also consider that taking a class will also disrupt your schedule in lab and may add additional reading to your workload. Depending on your work habits, and ability to go from doing lab to class work to reading meetings, you may want to think about how a class or two may be distracting. Before qualifying (i.e. during your first year), you should work out a tentative schedule for taking the remaining classes to fulfill your requirements for the INP, as well as decide how qualifying will fit into your second year. You can look at past year's course offerings, and check to see if any are cancelled, to see which classes may interest you (some classes are limited to fall or spring, so take that into consideration as well).

Q: If not class, can I teach and qualify?

A: As with taking a class, teaching will require additional time and attention outside of lab and reading for the qualifying exam. Time commitments vary widely between courses! Be sure to take that into account. One big thing to consider with teaching versus taking a course is that unlike a class, as a teacher you are responsible to other students. Students may ask for additional help outside of class time, and you are responsible for responding. In certain classes, you may be asked to grade, run study or lab sections, and all of this takes time. With that said, it is entirely possible to teach and qualify. Talking to other students about the class you are thinking about teaching will also provide you with a sense of how much time per week you may be expecting to devote to a class. Again, common sense and good time management should tell you whether or not you can do both.