

**COURSE PLANNING:
A SURVIVAL GUIDE FOR UNC SCHOOL OF PHARMACY FACULTY**

as part of the *“Time Out for Teaching: A faculty program for Teaching Excellence”*

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Step 1: Determine the learning outcomes for the course

Outcomes are for both the instructor and student. Outcomes guide the instructor in terms of what needs to be accomplished. In the same manner, outcomes guide the students to what they are supposed to be learning. These outcomes can be included in the syllabus, should be presented before each class session, and even included before each examination.

Course Goals

Course goals are broad, general outcomes that students should be able to perform as a result of experiences they undergo in a course (and consequently should appear as part of the overall course description in the syllabus). Goals should be written in such a way that evaluation of the outcomes is implied and can be foreseen. It may help to think what do you want student to know or be able to do one-year after they completed your course

Examples:

By the end of this course, you should be able to:

- Initiate therapy for a patient with diabetes including recommendations for follow-up monitoring
- Summarize the mechanism of action for the class of drugs or individual agents discussed in the class
- Locate a primary piece of literature and analyze the findings based on appropriate of study design and statistical methods

Objectives

Objectives are very specific outcomes that enable students to achieve the general course goals (and therefore are associated with particular units, lessons, or class meetings in the syllabus). Objectives should be written in terms of particular student behaviors so that the evaluations methods are explicit.

Examples:

By the end of this lesson, you should be able to:

- Calculate the creatinine clearance for a patient
- Draw the steroid backbone and correctly number the atoms
- Describe the major potential side effects of diuretics
- Re-create the JNC-7 flow chart for the treatment of hypertension

Types of objectives

Please note that there a various types of objectives and decisions have to made up front on what level of learning students need to accomplish as well as other aspects of learning not tied to content. Choosing the right verb is important as it relates to level of learning desired. In Appendix 5: Bloom's Taxonomy and associated verbs is a list of verbs related to various levels of learning according to Bloom's Taxonomy. Avoid phrases such as:

- ...have an understanding of...
- ...have an appreciation of...
- ...be acquainted with...
- ...be aware of...
- ...be cognizant...
- ...be conscious of...
- ...be familiar with...
- ...be knowledgeable about...

These phrases are vague. How do you test “awareness of”?

In addition to the Bloom’s Taxonomy, Fink introduced other major categories in the taxonomy of learning.

1. **Foundational Knowledge.** At the base of most other kinds of learning is the need for students to “know” something. Knowing, as used here, refers to students’ ability to understand and remember specific information and ideas. It is important for people today to have some valid basic knowledge, for example, about science, history, literature, geography, etc. They also need to understand major ideas or perspectives, for example, what evolution is (and what it is not), what capitalism is (and is not), and so forth.

Special Value: Foundational Knowledge provides the basic understanding that is necessary for other kinds of learning.

2. **Application.** This familiar kind of learning occurs when students learn how to engage in some new kind of action, which may be intellectual, physical, social, etc. Learning how to engage in various kinds of thinking (critical, creative, practical) is an important form of application learning. But this category of significant learning also includes developing certain skills (e.g., communication, playing the piano) or learning how to manage complex projects.

Special Value: Application learning allows other kinds of learning to become useful.

3. **Integration.** When students are able to see and understand the connections between different things, an important kind of learning has occurred. Sometimes they make connections between specific ideas, between whole realms of ideas, between people, and/or Human Dimension. When students learn something important about their own Self and/or about Others, it enables them to interact more effectively with themselves or with others. They discover the personal and/or social implications of what they have learned. What they learn or the way in which they learn sometimes gives students a new understanding of themselves (self-image) or a new vision of what they want to become (self-ideal). At other times, they acquire a better understanding of others: how and why others act the way they do, or how the learner can interact more effectively with others.

Special Value: This kind of learning informs students about the human significance of what they are learning.

4. **Caring.** Sometimes a learning experience changes the degree to which students care about something. This may be reflected in the form of new feelings, interests, and/or values. Any of these changes means students now care about something to a greater degree or in a way than they did before.

Special Value: When students care about something, they then have the energy they need for learning more about it and making it a part of their lives. Without the energy for learning, nothing significant happens.

5. **Learning How to Learn.** This occurs when students learn something about the process of learning itself. They may be learning how to be a better student, how to engage in a particular kind of inquiry (e.g., the scientific method), or how to become self-directing learners. All of these constitute important forms of learning how to learn.

Special Value: This kind of learning enables students to continue learning in the future and to do so with greater effectiveness.

Teaching Goals Inventory

One way to assess what your teaching goals are, beyond the area of content, is to take a teaching goals inventory. An inventory can help you identify what are your goal in class. For example, is communication skills a high priority in your course or is ethics or writing skills. The Learning and Teaching Webpage (pharmacy.unc.edu/labs-teaching-resources) has a link to such a Teaching Goals Inventory

Step 2: Decide how you will measure student achievement of the outcomes

Assessing if your students achieve the desired learning outcomes can be a daunting task especially if you are trying to assess higher-levels of learning or non-content related outcomes (e.g., communication, critical thinking, etc.). Like the objectives, assessment methods should match the desired level of learning (i.e., level of Bloom's taxonomy). For example, if the objective is at the knowledge level (e.g., define "diffusion"), then it would be inappropriate for the assessment to be analyze primary literature where the concept was studied. Here are some various assessment techniques.

Method	Positives	Negatives
Multiple Choice Question Assessment	<ul style="list-style-type: none"> • Easy to grade • Can be written for any level of learning • Relatively easy to write low-level questions 	<ul style="list-style-type: none"> • Writing reliable/valid questions requires training (see Appendix 6: Guidelines to writing Multiple Choice Questions) • Cannot assess communication skills • More difficult to assess higher levels of learning
Short Answer / Essay	<ul style="list-style-type: none"> • Easier to assess higher-level outcomes • Ability to assess written communication skills 	<ul style="list-style-type: none"> • Requires appropriate rubrics to minimize subjectivity • Time to grade
Papers and Presentations	<ul style="list-style-type: none"> • Easier to assess higher-level outcomes • Ability to assess communication skills 	<ul style="list-style-type: none"> • Requires appropriate rubrics to minimize subjectivity • Time to grade
OSCEs	<ul style="list-style-type: none"> • More authentic assessment of clinical skills • Easier to assess higher-level outcomes • Ability to assess communication skills 	<ul style="list-style-type: none"> • Requires appropriate rubrics to minimize subjectivity • Standardized patients or appropriate simulations
Oral Exams	<ul style="list-style-type: none"> • Easier to assess higher-level outcomes • Ability to assess communication skills 	<ul style="list-style-type: none"> • Requires appropriate rubrics to minimize subjectivity • Time to grade
Portfolios	<ul style="list-style-type: none"> • Easier to assess higher-level outcomes • Ability to assess communication skills • Can document the whole body of student work • Can include student reflections of the impact of the course 	<ul style="list-style-type: none"> • Requires appropriate rubrics to minimize subjectivity • Time to grade

Grading Schemes

Grading and grading schemes is an important element in the course design process and can be included almost anywhere in this document. The first step in developing a grading scheme is to define the standards itself. Ask yourself, “if students can achieve the goals that are set for them (i.e, the objectives you made in Step 1), what grade should the student receive?” Asking this questions is apropos because grades are in essence a certificate of competence. If students achieve the goals year to year, then grades should be the same year to year. The SoP does provide some basic guidelines for grades (found on the Faculty Blackboard) though these definitions are very general and subjective to interpretation.

A good grading system must meet three criteria: (1) it should accurately reflect differences in student performance, (2) it should be clear to students so they can chart their own progress, and (3) it should be fair. Performance can be defined either in relative (comparing students with each other) or absolute terms (measuring their achievement against a set scale), and each system has its defenders but in an outcome based course, the latter makes more sense. But whichever grading scheme you use, students should be able to calculate (at least roughly) how they are doing in the course at any point in the semester. Some relative grading schemes make it impossible for students to estimate their final grades because the cutoff points in the final distribution are not determined until the end of the course. A complete description of the grading system should appear in the course syllabus, including the amount of credit for each assignment, how the final grades will be calculated, and the grade equivalents for the final scores. Also, students should perceive the grading system as fair and equitable, rewarding them proportionately for their achievements. From the standpoint of measurement, many different kinds of assignments, spread over the entire semester provide a fairer estimate of student learning than one or two large tests or papers.

On a side not, grade distributions should probably *not* be bell-shaped (i.e., follow a normal distribution). While there are several reasons why, just consider a few reasons: (1) pharmacy students are a highly select group, not representative of the general population with respect to background or intelligence; (2) we cannot be sure that our tests accurately measure student achievement -- even standardized exams are suspect in this regard, and (3) it is our goal as teachers to help those not being successful to be successful! Finally, just a final note about grades. The lowest passing grade is ‘C’ in the SoP and if a student receives two ‘Fs’ they are subject to dismissal from the SoP.

Step 3: Select teaching strategies and methods that will enable students to achieve the outcomes

Step One involved the development of course and lesson outcomes while Step Two addressed the issue of how do you know students achieved the objectives of the course. Now it is time to think about you can help students' achieve those outcomes. There are various forms of teaching strategies. The following table provides information on types of teaching strategies and positives and negatives. As you design learning activities keep in mind that finding information is relatively easy nowadays and the emphasis should be then placed on skill development on how to use the information, interpret the information, analyze the information and communicate the information. The traditional lecture (e.g., talking for 50 min at the class) is a very efficient means to transmit information and it is as effective as other teaching strategies. However, there are two important points to make. The first is reading is as effective as lecturing and more efficient in delivering basic knowledge. The second is, lecture is a poor means to develop thinking skills, problem solving skills, communication, or any skill beyond memorizing information.

Method	Description	Positives	Negatives
"Traditional" Lecture	Instructors speaks for the allotted class time	<ul style="list-style-type: none"> • Efficient in transferring information ("low" level) to a large group • Careful presentation of material in a linear manner 	<ul style="list-style-type: none"> • Can only be used for content transfer • Relatively poor student retention of material • Learner is passive • Cannot achieve "high-levels" of learning
"Active" Lecture	Instructor speaks for most of the time but has "Active learning" breaks	<ul style="list-style-type: none"> • Efficient in transferring information("low" level) to a large group • Enhanced retention of information compared to "Traditional" lecture • Can reach middle levels of learning • Careful presentation of material 	<ul style="list-style-type: none"> • Can only be used for content transfer • Learner is passive for majority of class • Difficulty achieving "high-levels" of learning
Discussion		<ul style="list-style-type: none"> • Effective for attitudinal change and "high-level" learning • As good as lecture for content knowledge • Favors long term retention • Very interactive • Collaboration among students • Non-linear presentation of material 	<ul style="list-style-type: none"> • Less efficient than lecture in transfer content knowledge and can be unreliable • Large class requires careful planning and management • Methodology requires "trained" instructor • Requires student's prepare for class
Cooperative learning	This can take many forms but involves	<ul style="list-style-type: none"> • Effective for attitudinal change and "high- 	<ul style="list-style-type: none"> • Rate of transfer of information moderate

	students to work in small groups (4-10)	<p>level” learning</p> <ul style="list-style-type: none"> • Long term retention • Very interactive • Collaboration among students 	<p>and fairly reliable</p> <ul style="list-style-type: none"> • Large class requires careful planning and management • Methodology requires “trained” instructor • Large up-front time commitment • Requires students to prepare for class
Experiential	This would laboratory work, a clerkship or any other hands on activity	<ul style="list-style-type: none"> • Practice in a “real world” situation • Effective for attitudinal change and “high-level” learning • Long term retention • Very interactive • Collaboration among students 	<ul style="list-style-type: none"> • Rate of transfer of information moderate and fairly reliable • Requires sites for students to go to learn outside of class • Methodology requires “trained” instructor

Step 4: Select text and readings based on the outcomes

Choosing text and readings is an important part in getting students to prepare for class. Research has shown that only 20-30% of students complete readings before scheduled class time. Here are some tips in selecting readings and getting students to read and prepare:

Tip 1: Not every course is served by requiring a textbook: Consider not having a required textbook if:

- course structure duplicates text material (i.e., in-class lecture and/or discussion primarily “covers” basic material found in the textbook).
- no available text offers a good fit with the course. Instead, use custom publishing options to create a course reading packet tailored to the course.
- no textbook earns a triage score of “absolutely essential.” Use “Recommended Reading” lists with multiple copies of materials placed on library reserve.

Tip 2: “Less is more” applies to course reading: A triaged reading list should contain fewer, carefully chosen selections, thereby reducing student perception of a Herculean workload. Each of the remaining texts/reading assignments should connect obviously to the course: they should show up as part of in-class presentations, factor into course projects, or appear on examinations. Connections as obvious as these offer students an indisputable higher yield on their reading investment, thus increasing the likelihood that students will attempt the course reading assignments, a necessary first step for deriving intended benefits from the assignment.

Tip 3: Aim reading material at “marginally-skilled” students: Assess reading material to determine the level of reading skill students need in order to read the text in a manner and for the ends that the instructor has intended. A text included in the course readings primarily for entertainment purposes, for example, will require a less-strong set of student reading skills than will a text included for content purposes. Choosing reading material beyond the cognitive reach of the majority of enrolled students is unfair³ since it sets up an unequal learning environment tilted in favor of highly-skilled readers. It also invites dwindling levels of course-related reading compliance. Students will determine early on that further struggle to read “unreadable” assignments is not a warranted use of their study time.

Tip 4: Use Syllabus as a Teaching Tool: At their best, strong course syllabi can affect student compliance with course reading assignments. Effective syllabi do more than identify required reading materials; they provide background about the materials so that students understand why the reading assignments contribute to learning and how they relate to other course content and course activities. Your syllabus represents a significant point of interaction, often the first, between you and your students. If thoughtfully prepared, your syllabus will demonstrate the interplay of your understanding of students’ needs and interests; your beliefs and assumptions about the nature of learning and education; and your values and interests concerning course content and structure. This tip does not advocate for “dumbing down” college courses. Rather, it argues the fairness of choosing materials that are most appropriate for the primary user — pharmacy students.

Tip 5: Explain reading assignments' relevance: Explaining the reading assignment's relevance to the course topic and to the way that the course is structured is an investment worth making in the course syllabus and at strategic points within the term. This explanation is important to novices because they are not adept at making inferential connections between items that are seemingly dissimilar or only loosely related. Making the implicit explicit helps those students who need the most assistance in reading and comprehending course materials, particularly marginally skilled and unskilled readers

Tip 6: Assign reading close to use date: Providing students a rationale for assigning texts as they encounter new topics affects student reading compliance by highlighting the correspondence between the reading assignment and a meaningful part of the course. This timing decision closes several gaps that often limit the effectiveness of reading assignments: none-too-precise Day 1 overview statements combined with overly-focused day-to-day course activity.

Tip 7: Preview the reading

Many texts used in college courses intimidate students because of their organizational complexity, length, foreign vocabulary, and expectations about readers' background. Students can be helped "into the text" when faculty make the assigned reading material part of the in-class activity.

Tip 8: Use class activities that increase compliance and effectiveness: A number of active and collaborative learning strategies receive frequent praise for their utility in encouraging students to read course material. Included among those activities are the following:

- Reading Guides: Summarize important concepts found in assigned reading and identify areas where students may find the going tough. Useful items to include in a reading guide are such things as help with technical vocabulary, explanation of background concepts and cultural values that the author expects readers to be aware of, and suggestions for making the most out of illustrations, charts, graphs, and tables in the text.
- Study questions: Provided in class or via a course webpage, questions keyed to key points in the required reading can increase the numbers of students who read course material. However, the technique has a drawback in that students may use these questions as last-minute test preparation material, not as guides to help their "real-time" understanding of concepts.
- Short writing assignments: Ask students to explore in writing links between reading assigned for a class meeting and the topic(s) that will be addressed during the current class period (or, that were the focus of a preceding class meeting).

Tip 9: Use class time: Allow in-class time (approximately 15 minutes) for students to read material that is "high priority," particularly if that material will form the core of the class presentation or activities that follow.

Tip 10: Require prior reading: One reason that faculty assign course-based reading is so that students will, hopefully, be prepared and want to participate in subsequent class activity and discussions. Reading compliance is necessary to achieving this outcome, because it has been found that "failure to read assignments is a strong predictor of nonparticipation"

Step 5: Divide the course into logical units, based on the outcomes

While many faculty tend to organize the course according to instructor availability, having a cohesive course structure is critical to student learning. Organization of the content is extremely important in enhancing students' learning. Content can be arranged in several ways:

- Structurally based content is consistent with the way relationships in the field occur, e.g., spatial, chronological, physical, etc.
- Conceptually based content uses major ideas or concepts to show important relationships such as:
 - relationships of classes and groups of objects or phenomena
 - relationships of theory to application of theory, or rule to example, or evidence to conclusion
 - relationships that proceed from simplest ideas to those of more complexity, and abstractness
 - relationships of logical sequence in which one idea is necessary to comprehend the next.
- Learning-based content is organized by principles such as:
 - students should first learn skills that are likely to be useful later in life
 - students should encounter familiar ideas and simple phenomena before those that are more unfamiliar and complex
 - students should understand an idea or concept before attempting to interpret and use it
 - students should encounter material geared to their readiness to learn.
- Vocationally based content helps students become familiar with practice and employer needs.
- Knowledge utilization content is arranged so problem-solving situations encourage students to take responsibility for developing logical, organized solutions.
- Knowledge-creation based content is organized around processes of generating, discovering, or verifying knowledge in the field. It shows how scholars discover relationships and draw valid inferences.
- Values-based content is organized around issues, dilemmas, ethical problems or value dimensions that help students clarify and become committed to values and beliefs.

Remember, the School has many courses working synchronously to achieve a common goal. As such, content across courses should be aligned to maximize the learning. Please be careful when re-structuring your course because it may mis-align the content with other courses.

Step 6: Develop a syllabus that tells students what they have to do to achieve the outcomes

A syllabus serves many functions. It should be used to develop a well-grounded rationale for your course, allow students to understand what they will be able to do as a result of taking your course, and how their work will be appropriately assessed, and structure your students' active involvement in learning, identify and develop resources. Most importantly, compose your syllabus with a focus on student learning. Below are general guidelines of what should be in the syllabus. The School has template for the syllabus that can be found in the appendix and on the Pharmacy Faculty Blackboard page

Your syllabus should contain

1. Course Information: What do students need and/or want to know about the course? What pre-requisites exist?
2. Instructor Information: What do I want students to know about myself? My interest in the discipline? My teaching philosophy? How can I convey my enthusiasm for teaching, for the course? Other instructors in the course (e.g., graduate TAs, peer tutors, team teacher)?
3. Course Description: What content will the course address? How does the course fit in with other courses in the discipline? Why is the course valuable to the students? How is the course structured? Large lecture with discussion sessions? Large lecture with laboratory and discussion sessions? Seminar? How are the major topics organized?
4. Course Objectives: What will the students know and be able to do as a result of having taken this course? What levels of cognitive thinking do I want my students to engage in? What learning skills will the students develop in the course?
5. Instructional Approaches: Given the kind of learning I'd like to encourage and foster, what kinds of instructional interactions need to occur? Teacher-student, student-student, student-peer tutor? What kinds of instructional approaches are most conducive to helping students accomplish set learning objectives? How will classroom interactions be facilitated? In-class? Out-of-class? Online? Electronic discussion? Newsgroups? Chatroom?
6. Course Requirements, Assignments: What will students be expected to do in the course? What kinds of assignments, tests do most appropriately reflect the course objectives? Do assignments and tests elicit the kind of learning I want to foster? Assignments (frequency, timing, sequence)? Tests? Quizzes? Exams? Papers? Special projects? Laboratories? Field trips? Learning logs? Journals? Oral presentations? Research on the web? Web publishing? Electronic databases?
7. What kinds of skills do the students need to have in order to be successful in the course? Computer literacy? Research skills? Writing skills? Communication skills? Conflict resolution skills? Familiarity with software?
8. Course Policies: What is expected of the student? Attendance? Participation? Student responsibility in their learning? Contribution to groupwork? Missed assignments? Late work? Extra credit? Academic dishonesty? Makeup policy? Classroom management issues? Laboratory safety?
9. Grading, Evaluation: How will the students' work be graded and evaluated? Number of tests? In-class? Take-home? Point value? Proportion of each test toward final grade? Grading scale How is the final grade determined? Drop lowest grade? How do students receive timely

- feedback on their performance? Instructor? Self-assessment? Peer review? Peer tutors?
Opportunities for improvement? Ungraded assignments?
10. Texts/Resources/Readings/Supplies: What kinds of materials will be used during the course? Electronic databases? Electronic Course Reserve? Course Webpage? Software? Simulations? Laboratory equipment? What kinds of instructional technologies will be used?
 11. Course Calendar: In what sequence will the content be taught? When are major assignments due? Fieldtrips? Guest speaker?
 12. Study Tips/Learning Resources: How will the student be most successful in the course? What resources are available? Online quiz generator? Study guides? Lecture notes online? Lecture notes on reserve in library? Guest speaker to explain/demonstrate online resources? TA? Peer tutors? Study groups? Academic Services Center? Writing Center? Evaluation of online resources? Citation of web resources?
 13. Student Feedback on Instruction: Anonymous suggestion box on the web? E-mail? Student feedback at midterm for instructional improvement purposes? End-of-term student feedback? Supplement to departmental student feedback form?
 14. Miscellaneous Information: Instructor biography? Instructor personal statement? Student information form? Other instructor information (e.g., TA)?
 15. Additional questions to consider: How detailed, explicit should the syllabus be? Will there be some flexibility built into the syllabus? How to word the syllabus so that it is user-friendly?

Appendix 1: Important Dates

See the Pharmacy Faculty page on Blackboard for important semester dates

Appendix 2: Syllabus guidelines

As outlined in the Policy for Delivery of Course Materials and Exams your syllabus must adhere to the MINIMUM standards approved by the School of Pharmacy. At minimum, the syllabus will provide:

- Course number, title, description, meeting time and location
- Names and contact information for all faculty and teaching assistants participating in the course
- List of required texts and learning resources (e.g. reserve readings, course packs, electronic materials), including information about how students may obtain them
- Course goals and/or learning outcomes (should link to the 2004 CAPE curriculum outcomes)
- Course schedule (date, topic, instructor, assignments, objectives, exam dates, and review sessions). Exam and exam review dates must be confirmed by the Office of Curricular Affairs and scheduled on the School's master calendar and IT support calendar before the semester begins to insure availability of appropriate classroom space and IT support for students on both the UNC and ECSU campuses.
- Faculty and TA office hours, including times and locations. Requests for IT support for office hours for remote students should be forwarded to ITSOP@unc.edu at the beginning of each semester.
- Brief description of teaching/learning methods (how is the course conducted?)
- List and full description of course assignments or an overview of the assignments and referral to the location of the full description (e.g. if posted on Blackboard).
- Assessment and grading guidelines, including
 - point allocation for graded assignments and exams
 - numerical grading scale for course (compatible with SoP academic progression guidelines)
- Expectations for classroom decorum and academic integrity (honor code), including expectations for attendance and consequences for non-attendance
- Course policy for remediation, re-testing and/or resolving IN grades. *Note: By University policy, IN grades must be resolved before the student may progress to any course for which this course is a prerequisite; all others should be resolved by the end of the eighth week of the following semester*

Note: A syllabus template is available on the faculty “course” on Blackboard. Additionally, the UNC Center for Teaching and Learning provides a syllabus preparation tutorial on its website.

Appendix 3: Seven Principles of Good Practice

The “Seven Principles of Good Practice” were created by Chickering and Gamson. These principles and the suggestions for implementation were distilled from decades of research on learning in higher education. The investigators are leading scholars in faculty and student development who, amongst other things, solicited the ideas of hundreds of faculty members and administration in North American colleges and universities.

1. **Encourages contact between students and faculty:** Frequent student-faculty contact in and out of classes is the most important factor in student motivation and involvement. Faculty concern helps students get through rough times and keep on a working. Knowing a few faculty members well enhances students’ intellectual commitment and encourages them to think about their own values and future plans
2. **Develops reciprocity and cooperation among students:** Learning is enhanced when it is more like a team effort than solo race. Good learning, like good work, is collaborative and social, not competitive and isolated. Working with others often increases involvement in learning. Sharing one’s own ideas and responding to others’ reactions sharpens thinking and deepens understanding.
3. **Encourages active learning:** Learning is not a spectator sport. Students do not learn much just by sitting in classes listening to teachers, memorizing pre-packaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experience and apply it to their daily lives. They must make what they learn part of themselves
4. **Gives prompt feedback:** Knowing what you know and don’t know focuses learning. Students need appropriate feedback on performance to benefit from courses. When getting started, students need help in assessing existing knowledge and competence. In classes, students need frequent opportunities to perform and receive suggestions for improvement. At various points during college, and at the end, students need chances to reflect on what they have learned, what they still need to know, and how to assess themselves
5. **Emphasizes time on task:** Time plus energy equals learning. There is no substitute for time on task. Learning to use one’s time well is critical for students and professionals alike. Students need help in learning effective time management. Allocating realistic amounts of time means effective learning for students and effective teaching for faculty. How an institution defines time expectation for students, faculty, administrations, and other professional staff can establish the basis of high performance for all.
6. **Communicates high expectations:** Expect more and you will get more. High expectations are important for everyone – for the poorly prepared, for the unwilling to exert themselves, and for the bright and well motivated. Expecting students to perform well becomes a self-fulfilling prophecy when teachers and institutions hold high expectations for themselves and make extra efforts. However, make expectations are reasonable and appropriate and by no means does high expectations mean “learning more stuff”.
7. **Respects diverse talents and ways of learning:** There are many roads to learning. People bring different talents and styles of learning to college. Brilliant students in the classroom maybe all thumbs in the lab. Students rich in hands-on experience may not do so well with theory. Students need the opportunity to show their talents and learn in ways that work for them. Then they can be pushed to learn in new ways that do not come so easily.

Appendix 4: Elements of “Good Teaching”

Some elements of teaching supported by research.

1. Planning the course in such a way that students can easily follow its organization
2. Developing course goals that emphasize higher-order learning
3. Providing challenging and interesting assignments
4. Clearly communication your expectations for student performance
5. Varying the instructional strategies used in the course
6. Using classroom techniques that involves the students actively in the subject matter
7. Insuring that you communication of the subject matter is clear
8. Showing enthusiasm for the subject matter and for teaching
9. Providing ways for students to receive individual help if they need it
10. Giving prompt, constructive feedback to students on their performance
11. Using grading practices that insure fairness and impartiality
12. Demonstrating that you care about students and how well they are learning in your course

Appendix 5: Bloom's Taxonomy and associated verbs

Asking students to think at higher levels, beyond simple recall, is an excellent way to stimulate students' thought processes. Different types of questions require us to use different kinds or levels of thinking.

See a list of verbs for use in lesson plans and discussion questions that correlates to Bloom's levels of thinking.

According to Bloom's Taxonomy, human thinking skills can be broken down into the following six categories.

1. **Knowledge:** remembering or recalling appropriate, previously learned information to draw out factual (usually right or wrong) answers. Use words and phrases such as: how many, when, where, list, define, tell, describe, identify, etc., to draw out factual answers, testing students' recall and recognition.
2. **Comprehension:** grasping or understanding the meaning of informational materials. Use words such as: describe, explain, estimate, predict, identify, differentiate, etc., to encourage students to translate, interpret, and extrapolate.
3. **Application:** applying previously learned information (or knowledge) to new and unfamiliar situations. Use words such as: demonstrate, apply, illustrate, show, solve, examine, classify, experiment, etc., to encourage students to apply knowledge to situations that are new and unfamiliar.
4. **Analysis:** breaking down information into parts, or examining (and trying to understand the organizational structure of) information. Use words and phrases such as: what are the differences, analyze, explain, compare, separate, classify, arrange, etc., to encourage students to break information down into parts.
5. **Synthesis:** applying prior knowledge and skills to combine elements into a pattern not clearly there before. Use words and phrases such as: combine, rearrange, substitute, create, design, invent, what if, etc., to encourage students to combine elements into a pattern that's new.
6. **Evaluation:** judging or deciding according to some set of criteria, without real right or wrong answers. Use words such as: assess, decide, measure, select, explain, conclude, compare, summarize, etc., to encourage students to make judgements according to a set of criteria.

Note: In some cases Synthesis and Evaluation positions are switched. Regardless, they still represent the highest levels of cognitive learning

Level	Verbs
Knowledge	Count, Define, Describe, Draw, Enumerate, Find, Identify, Label, List, Match, Name, Read, Recall, Recite, Record, Reproduce, Select, Sequence, State, Tell, Quote, View, Write
Comprehend	Classify, Cite, Conclude, Convert, Describe, Discuss, Estimate, Explain, Generalize, Give examples, Illustrate Interpret, Locate, Make sense of, Paraphrase, Predict, Report, Restate, Review, Summarize, Trace, Understand
Apply	Act, Administer, Articulate, Assess, Change, Chart, Choose, Collect, Compute, Construct, Contribute, Control, Demonstrate, Determine, Develop, Discover, Dramatize, Draw, Establish, Extend, Imitate, Implement, Interview, Include, Inform, Instruct, Paint, Participate, Predict, Prepare, Produce, Provide, Relate, Report, Select, Show, Solve, Transfer, Use, Utilize
Analyze	Break down, Characterize, Classify, Compare, Contrast, Correlate, Debate, Deduce, Diagram, Differentiate, Discriminate, Distinguish, Examine Focus, Illustrate, Infer, Limit, Outline, Point out, Prioritize, Recognize, Research, Relate, Separate, Subdivide
Synthesize	Adapt, Anticipate, Categorize, Collaborate, Combine, Communicate, Compare, Compile, Compose, Construct, Contrast, Create, Design, Develop, Devise, Express, Facilitate, Formulate, Generate, Incorporate, Individualize, Initiate, Integrate Intervene, Invent, Make up, Model, Modify, Negotiate, Organize, Perform, Plan, Pretend, Produce, Progress, Propose, Rearrange, Reconstruct, Reinforce, Reorganize Revise, Rewrite, Structure, Substitute, Validate
Evaluate	Appraise, Argue, Assess, Choose, Compare & Contrast, Conclude, Criticize, Critique, Decide, Defend, Evaluate, Interpret, Judge, Justify, Predict, Prioritize, Prove, Rank, Rate, Reframe, Select, Support,

Appendix 6: Guidelines to writing Multiple Choice Questions

(adapted from the National Board of Medical Examiners guidelines)

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Overview

These guidelines focus on how to write high-quality, multiple choice questions (MCQ) that assess acquisition of foundational knowledge, interpretation of data, and application of data and knowledge to therapeutic decision-making. In order for a test question to be a “good” one it must satisfy two essential criteria. First, the test question must address important content. Second, items that effectively assess critically important topics **MUST** be well structured, avoiding flaws that benefit the test-wise examinee or confuse the well prepared learner. Avoiding irrelevant difficulty, i.e. rigor imposed emphasis on trivial detail or a confusing exam structure rather than the intellectual challenge of the assessment items, must be achieved in order for test questions to generate valid scores.

There are several categories of MCQ questions, the most common of which are true/false and the single item correct formats. This description will focus on questions with a single correct item. One-best-answer questions consist of a stem (e.g., a clinical case presentation) and a lead-in question, followed by a series of choices, typically one correct answer and 4 distracters (although research suggests little difference between 2, 3, and 4 distracters). All the distractors, that is the incorrect options, may not be totally wrong but are less correct or complete than the “keyed answer” (i.e., there is a continuum from the ‘best answer’ to the ‘poorest answer’).

Quick Summary on writing MCQ

- Make sure the item can be answered without looking at the options OR that the options are 100% true or false
- Include as much of the item as possible in the stem; the stems should be long and the options short.
- Avoid superfluous information
- Avoid “tricky” and overly complex items

- Write options that are grammatically consistent and logically compatible with the stem; list them in logical or alphabetical order. Write distractors that are plausible and of similar length as the answer
- Avoid using absolutes such as ‘always’, ‘never’, and ‘all’ in the options; avoid using vaguer terms such as ‘usually’ and ‘frequently’
- Avoid negatively phrased items (e.g., those with ‘except’ or ‘not’ in the lead-in). If you must use negative stem, use only short (preferable single word) options. Absolutely avoid double negatives.
- And most important of all: Focus on important concepts, don’t waste time testing trivial facts

Basic Rules for writing MCQ:

1. **Each item should focus on an important concept, typically a common clinical problem.** Don’t waste testing time with questions assessing knowledge of trivial facts. Focus on problems that would be encountered in real life for new practitioners or young scientists (and not situations for tenured clinicians). Avoid trivial or overly complex questions
2. **Most items should assess application of knowledge, not recall of an isolated fact.** The item stems may be relatively long; the options should be short. Clinical vignettes provide a good basis for a question. For clinical sciences, each should begin with the presenting problem of a patient, followed by the history, physical findings, result of diagnostic studies, initial treatment, etc. Vignettes may include only a subset of this information but the information should be provided in this specified order. For basic sciences, patient vignettes may be very brief; “laboratory vignettes” are also appropriate.
3. **The stem of the item must pose a clear question, and it should be possible to arrive at an answer with the options covered.** To determine if the question is focused, cover up the options and see if the question is clear and if the examinees can pose an answer based only on the stem.
4. **All distractors (i.e., incorrect options) should be homogenous.** They should fall into the same category as the correct answer (e.g., all diagnoses, test, treatments, medications, dosages). Avoid using “double options” (e.g., do W and X; do Y because of Z) unless the correct answer and all the distractors are double options. All distractors should be plausible, grammatically consistent, logically compatible, and of the same relative length as the correct answer. Order the options in logical order or in alphabetical order.
5. **Avoid technical item flaws that provide special benefit to test-wise examinees or that pose irrelevant difficulty.**
6. **Do NOT write any questions of the form “Which of the following statements is correct?” or “Each of the following statements is correct EXCEPT.”** These questions are unfocused and have heterogenous options. These suffer from the same problem as true/false questions, if options cannot be rank-ordered on a single continuum, the examinee cannot determine either the “least” or the “most” correct answer.

Flaws to Avoid

1. **Grammatical cues:** one or more distractors don’t follow grammatically from the stem
2. **Logical cues:** a subset of the options are collectively exhaustive
3. **Absolute terms:** terms such as “always” or “never” are used in options

4. **Long correct answer:** correct answer is longer, more specific, or more complete than other options
5. **Word repeats:** a word or phrase is included in the stem and in the correct answer
6. **Convergence strategy:** the correct answer included the most elements in common with other options
7. **Options are long, complicated, or double:** Stems contains extraneous reading, but, more importantly, the options are very long and complicated. Trying to decide among these topics requires a significant amount of reading because of the number of elements in each option. This can shift what is measure by an item from content knowledge to reading speed.
8. **Numeric data are not stated consistently**
9. **Frequency terms in the topics are vague (e.g., rarely, usually):** vague terms are not consistently defined or interpreted even by experts.
10. **Language in the options is not parallel; options are in an illogical order**
11. **“None of the above” is used as an option:** The phrase ‘None of the above’ is problematic in items where judgment is involved and where the options are not absolutely true or false
12. **Items that are “tricky” or unnecessarily complicated**

Example Stems

1. A (*patient description*) has (*history findings*) and is taking (*medications*). Which of the following medications is the most likely cause of his (*one history, PE or lab finding*)?
2. A (*patient description*) is currently on (*specific medication*). Which of the following conditions is most likely to occur?
3. A (*patient description*) has (*symptoms, signs, or specific disease*) and is being treated with (*drug or drug class*). The drug acts by inhibiting which of the following (*functions, processes*)?
4. A (*patient description*) has (*abnormal findings*). What would the most appropriate (*drug therapy*)?
5. A (*patient or group description*) became ill with (*symptoms and signs*). Which of the following (*organisms, agents*) is most likely to be the cause?
6. A (*patient description*) has (*symptoms and signs*). Exposure to which of the (*toxic agents*) is the most likely cause?
7. Which of the following is the most likely mechanism of the therapeutic effect of this (*drug class*) in patients with (*disease*)?

Sample Lead-ins and Option Lists

1. Which of the following is (abnormal)?
Options sets could include sites of lesions; list of nerves; list of muscles; list of enzymes; list of hormones; types of cells; list of neurotransmitters; list of toxins, molecules, vessels, spinal segments.
2. Which of the following findings is most likely?
Options sets could include list of laboratory results; list of additional physical signs; results of microscopic examination of fluids, serum levels.
3. Which of the following is the most likely cause?
Options sets could include list of underlying mechanisms of the disease; medications that might cause side effects; drugs or drug classes; toxic agent.
4. Which of the following should be administered?

Options sets could include drugs, vitamins, amino acids, enzymes, hormones.

Template for Adverse Effects Pharmacology – "Guess My Drug"

Item Stem (Patient Vignette): (Describe a patient with adverse drug effect)

Lead-In: Which of the following drugs has the patient most likely been taking?

Options: (List of drugs)

Template for Site/Mechanism of Action Items – Pharmacology

Item Stem (Patient Vignette): (Describe a patient who requires pharmacotherapy)

Lead-In: A drug with which of the following sites/mechanisms of action

Options: (List of mechanisms of action) OR (List of sites of action)

Template for Integrative Indications Items:

Microbiology/Pharmacology

Item Stem (Patient Vignette) (Describe a patient with a problem)

Lead-In: Infection with which of the following pathogens is most likely?

Options: (List of pathogens)

or

Lead-In: Administration of which of the following drugs is most appropriate?

Options: (List of drugs)

Template for Integrative Physiology/Pharmacology Items

Item Stem (Patient Vignette): (Describe a patient with a problem)

Lead-In: Administration of a drug aimed at achieving which of the following effects is most appropriate? *OR* Administration of {specific drug} is most likely to have which of the following effects?

Options: (List of physiological effects)