Activity: How to Write a Bad Exam

Activity Type: Small group discussion, student presentations

Goal: Discussion leaders will learn to write good exam questions by deliberately writing bad ones

Abstract:

<table>
<thead>
<tr>
<th>Pre-class prep</th>
<th>10 min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair up, create bad questions, write on board</td>
<td>15 min</td>
</tr>
<tr>
<td>Rest of class tries to determine the “bad” being demonstrated</td>
<td>10 min</td>
</tr>
<tr>
<td>Discuss extra details regarding other mistakes, versions, grading</td>
<td>5 min</td>
</tr>
</tbody>
</table>

Time needed: 30-50 minutes

Materials needed: index cards, poster materials (whiteboards and dry-erase markers, or poster paper and poster markers and tape), sufficient exam guidelines worksheets (attached).

Before class:
1. Determine how much time is available for the activity. More posters need more time for debriefing.
2. Create enough index cards with “bad exam” instructions so each pair of discussion leaders will have one. If group is very small and time permits, have two cards per pair. Possible cards:
   a. Options in multiple choice question are long and complicated
   b. Question is on a nit-picky topic
   c. The stem is short and the options are all very long
   d. Multiple choice options use “none of the above” or “a and b”
   e. A fill-in-the-blank allows more than one right answer
   f. True-false questions become a logic problem rather than a biological one.
   g. The correct answer in a multiple choice question is the longest answer
   h. A short answer question is too open-ended to be easily graded
   i. A question contains NOT or other confusing alternatives

During class:
(15 min) Hi all! How is teaching going?
Since there will be a midterm in lecture on Friday this week, I thought today we would talk about writing exams. This will help you write quiz questions in discussion and help you offer constructive advice to faculty when they write exams. Please get into pairs, and sit far away from other pairs. I am going to pass out a card to each group, and each card has a possible “bad way to write a question” written on it. Don’t let any other group find out what your card says. Your job is to create a test question that has the problem listed on your card, and it should be a question with content that could appear in your discussion.
I’m going to give you five or ten minutes to invent a bad exam question, and then I want you to write it on the board. Okay? Go ahead.

(10 min) Now that everyone has written their questions on the board, I want you to look at each one. Discuss and write down what you think the “problem” for each question was supposed to be on a piece of scratch paper.

Now we’ll go over the questions. What do you think the problem is? What is it really? Good! What are some other ways that bad exams can be written?

I’ve created a handout for you to keep that lists these tips more thoroughly. (pass out “Ways to Write a Good Exam,” below).
Ways to Write a Good Exam

Guidelines for exam-writing are found in many textbooks and in the literature. Some are common-sense (use good grammar), but others have been studied experimentally.

Exam writers call a multiple choice exam question an item, consisting of the stem (the question), and the options. One option is correct, the others are distractors. Here are the most common guidelines, with our philosophy and the research results indicated where present:

1. Avoid complex (called K-type) questions (“a and b,” “a and c”). Research has indicated these questions are more difficult (fewer students get them correct) but not more discriminating (good students do not do better compared to poor students).

2. Make only one answer correct, and the others clearly and defensibly wrong.

3. We see pedagogical value in writing a complete question stem that sets up the biology and asks the question at the end. This anchors the student to the learning goal we are testing. Exam guidelines also consistently recommend complete stems rather than:
   a. incomplete stems (“In mitochondria, ____”)
   b. blanks (“In the mitochondria, a high concentration of ___ is in the stroma.”)
   c. unfocused stems (“Which of the following is true?”)

Research results are mixed, however, about whether a non-complete stem in an otherwise clear question increases difficulty or reduces discrimination.

4. Avoid the use of “all of the above” or “none of the above.” Research indicates using “none of the above” often increases the item difficulty, and using “all of the above” often reduces the item discrimination.

5. Questions only need three options (1 correct, 2 distractors). Very few students guess randomly and generally choose within the three best choices.

6. Keep the stem concise and options short. Research shows that long, complicated questions are particularly difficult for slower readers and English language learners. Higher Bloom’s level questions do require text to set up the biology, but we minimize extra verbiage in the stem and we try to keep each option one line long or less.

7. We recommend only sparing use of negative questions (“Which is NOT” or “Which is FALSE”). These can be difficult for students to logically follow. If you do use one, be sure to capitalize NOT. Research shows no strong effect of negative question types, as long as there are no double negatives or other confusions.

8. Avoid absolute terms like “always” or “never.” We found we were using these to make otherwise true options wrong, as there is rarely a clear “always” or “never” in science. We also avoid vague terms like “rarely” or “usually.”

9. Be careful that the longest answer isn’t the correct answer. This is a common cue that students will use to guess more accurately.

There is evidence that flawed questions make an exam less valid – meaning they do not test as effectively for comprehension of science. This is why we encourage faculty to keep these guidelines in mind.

For the latest guidelines and other resources go to http://www.researchandteaching.bio.uci.edu/faculty.html