Tests As Teaching Tools

https://www.youtube.com/watch?v=H1_w2iadPUc
Most post-secondary courses assess student learning using independent testing.

Independent testing began early in mid-1800's in United States in Boston schools.

By early 1900's independent testing was promoted as a superior way to standardize student achievement in mathematics, English, spelling, drawing, etc.
**Negative Effects**

Misleading measure of students’ overall achievement
Test anxiety
Instructor anxiety – must “cover content”
Often lack of immediate feedback or no feedback if only a score
Questionable level of retention – students study and forget
*Cheating...

**Positive Effects**

Standardization
Ease of grading
Time Effective
Objective and Quantitative Assessment

**Independent Testing**

Single measure to compare individuals
Uniform conditions administered
Questions have one specific answer
Often only 2-3 exams/course/semester
Determines entire course grade
*High Stakes – passing test has important consequences – diploma, scholarship, license to practice a profession.*
Low Stakes Activities
Selective activities that can be performed in or out of class; used in active learning environments. Intent is to develop critical thinking skills, increase repetition, improve recall/retrieval.

Advantages:

Student centered activities; promote active learning
Clarify difficult topics, identify misconceptions
Clarify relationships between topics
Remove lecture burden of massive content and “covering everything”

Disadvantages:

Time constraints in classes – evaluating all student work on an activity
If not careful, grading of multiple projects can become massive
Development of grading rubrics
Buy and/or return a clicker...carry it around.
Designing a Meaningful Low Stakes Activity:

Focus on outcome that you want students to have:

1. Identify desired results (learning goals; e.g. students will develop an understanding of concept X)

2. Determine evidence for learning (outcomes and assessment; e.g. quiz/clicker scores, degree of active participation in a discussion)

3. Plan learning experiences (activities) to achieve these desired results

Choose a Specific Activity or Tool:

Student response systems (Clickers)       Muddy point Q&A
Puzzles                                 Concept mapping
In class discussions                    Minute papers
The immune system uses a combination of cells and activated proteins to isolate, bind with, and destroy harmful foreign substances.
A man with a cold enters an elevator and sneezes on his hand. He then places his finger on the elevator button, travels to the floor, then gets off. You enter on that floor and rub your hand against that same button. After that you rub your eye..... You have now been infected with BUG X....

Bug X now invades your eye, enters your naso-lacrimal duct, and reaches your nasal mucosa. It divides and multiplies, and begins to infect your cells.

Given what you know about the initial inflammatory process, what TWO main events occur (as illustrated on the chart from lecture) when Bug X invades? Fill in your answers in the blank boxes above before proceeding the the next sheet.
Activity:

1. Ability of the students to fill out a guided concept map

Or

2. Have students generate the concept map. Assess complexity (how many interactions can they come up with)

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1. Macrophages, dendritic cells, and neutrophils are phagocytic.
2. B and T cells are lymphocytes.
3. Monocytes enlarge 5x to become macrophages.
4. The chemical released by basophils is histamine.
5. The proteins that enter the area and lyse cells are complement proteins.

Now, answer the following questions:
1. Which of the cells dies quickly after a few phagocytic events?
2. Which of the cells above functions as an antigen presenting cell?
3. Which of the cells clones? Of those that clone themselves, which forms plasma cells? What do plasma cells produce?
4. The membrane attack complex is formed by clumping of the ______
1. Greater number of correct (or logical) responses if filling in instructor guided map

OR

2. If student generates own map, then more complex map (with appropriate connections) indicates greater understanding of the topic if student generated
Now it’s your turn….to design a meaningful low stakes activity

Remember:

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EXAMPLE #2 Utilizing Your Assessment as a Method for Teaching - Tests as Teaching Tools

Behavioral Advantages:

- Retrieval practice
- Immediate feedback to students and professors
- Promotes active learning

Does it Work?

- Improved scores on examination
- Improved content recall, but may depend on level of difficulty of course
- Improved attitude toward learning the subject matter
- When combined with firm academic policies, may be associated with a decrease in academic dishonesty

- Are many formats—m/c, short answer, hybrid, collaborative
• Typical quiz is a single problem covering an item from a past homework, exam or lecture
• Reinforces topics that students showed weakness in homework, exam
• Teaching archive allows students to preview exams, etc. (transparency in teaching)

What can participants do – do any do it already?
# Teaching Archive — past exams, quizzes, homeworks

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Semesters</th>
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<tbody>
<tr>
<td>ECE 415</td>
<td>Introduction to Electrical and Computer Engineering</td>
<td>Fall 2015, Fall 2014</td>
</tr>
<tr>
<td>ECE 410</td>
<td>Electrical Circuit Analysis</td>
<td>Spring 2009</td>
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<tr>
<td>ECE 310</td>
<td>Discrete and Continuous Signals and Systems</td>
<td>Summer 2013, Fall 2012, Summer 2012, Summer 2011</td>
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<td>ECE 340</td>
<td>Electronics I</td>
<td>Spring 2014, Fall 2013, Spring 2013, Fall 2012, Summer 2012, Spring 2012, Fall 2011, Spring 2011, Fall 2010, Spring 2010, Fall 2009</td>
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<tr>
<td>ECE 342</td>
<td>Electronics II</td>
<td>Fall 2014</td>
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<td>ECE 320</td>
<td>Principles of Automatic Control</td>
<td>Spring 2010, Fall 2009</td>
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<td>ECE 356</td>
<td>Senior Design I</td>
<td>Fall 2015, Spring 2015, Fall 2013, Spring 2013, Spring 2012, Fall 2011, Spring 2011, Fall 2010, Spring 2010, Fall 2009</td>
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<td>ECE 397</td>
<td>Senior Design II</td>
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<td>ECE 410</td>
<td>Network Analysis</td>
<td>Fall 2015, Fall 2014, Fall 2013, Fall 2012, Fall 2011, Fall 2010, Fall 2009</td>
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<tr>
<td>ECE 445</td>
<td>Analysis and Design of Power Electronic Circuits</td>
<td>Spring 2002</td>
</tr>
</tbody>
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Old exams for Bios 100 Cells & Organisms

Old first exams Bios 100

Old second exams Bios 100
... keep in mind, I have altered topics significantly in past years, so topics might not match for some years ...

Old exams, Bios 100 exam 3
Keep in mind, I have radically altered the material that appears in exam 3 over the years; some times it has been mostly physiology, which we will get into for the 4th exam ...

Old exam 4s
Keep in mind that the order of material in past versions of the course has differed very much from the present order ...

Old Final Exams
Bios 100: Biology of Cells & Organisms

Robert Paul Malchow & Michael Muller

Blackboard - key source for course info

Info not in book will be on Blackboard or Mastering Biology Web site

Malchow office hours

Wed 9-10 outside my lab, 4083 SEL until Feb 24; then 9-10 at the Latino Cultural Center
Wed 1-2
African American Cultural Center Library, 2nd floor Addams Hall

iClicker needed – buy at UIC bookstore
Either version will work but it must be an iClicker!
CALVIN CYCLE

Light-dependent reactions occur in thylakoids.

Light-independent reactions (C3 cycle) occur in stroma.

end product = glucose
A small acorn over time can grow into a huge oak tree. The wood in such a tree can weigh many tons, even after it has been cut into logs and dried. Where does most of this mass come from as the tree grows?

A) Minerals in the soil
B) Organic matter in the soil
C) Gases in the air
D) Sunlight
E) Water
COLLABORATIVE TEST TAKING

BENEFITS FOR LEARNING AND RETENTION

Davida Bloom

Abstract. The results of a two-year study indicate that collaborative testing is a valuable pedagogical strategy that can both assess and enhance student learning. After finishing their first attempt at each exam, students were given a second attempt either working collaboratively in small groups or individually with open books and notes. Collaborative testing consistently produced significantly higher test scores. In addition, students’ retention of course content is shown to be improved when collaborative testing is used. Concerns about grade inflation are alleviated through the use of proportionally weighted grading.

Keywords: examinations, learning assessment, collaborative testing, student learning, information retention
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- Take test as usual (“solo”)
- 50 multiple choice questions
- Worth 80% of Total Exam Grade


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Take same test during discussion
- Groups of 4

Use any resource to answer each question
(Book, power points, internet, TA, peer tutor, instructor ...)
- Worth 20% of Total Exam Grade
Students asked via clicker:

Was the retake a useful learning experience?

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Design a collaborative testing environment for your current courses

Discuss with Group; share with all
References: