



Center for the Advancement of Teaching-Learning Communities

Assessment as a Tool for Learning

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I am a sophomore majoring in Kinesiology and Nutrition. I plan to go to physical therapy school. Maybe medical school, not sure. My freshman year GPA was a 3.75. In high school I never studied.

I am taking Anatomy and Physiology this semester. My friend said it was really hard, so I decided to really work. I review all the material ahead of time and come to nearly all of the lectures. I attend all my labs. My TA is great. Professor H. Simpson is really low key and the lectures are right out of the book.



The first lab and lecture exams were so – so. Some of the material I had in Bio, so I squeaked by with a 75%. I studied much harder for the second exam which I just took. I bombed it--a 45%. I've never earned a score this low!

The exams are m/c—I know it's a large class, so this is what they do. But I figure I should *recognize* the terms, right? So we learned that some types of cells communicate by action potentials. But that wasn't even on the exam!!!! But there were these questions asking us what would happen to a cell's membrane potential when Na⁺ and K⁺ voltage-gated channels open and close, and on and on. I mean, seriously? Dude--are we supposed to know this?



I am never going to make it to physical therapy school.



What issues might contribute to my problem?

Did I get any feedback from this assessment strategy to help my learning?

What did the assessment motivate me to do? How did my study technique change between exam 1 and exam 2? How do you think I will continue to prepare?

What suggestions would you have for my professor?



What is the definition of assessment?

Assessment is a tool for understanding what students are learning

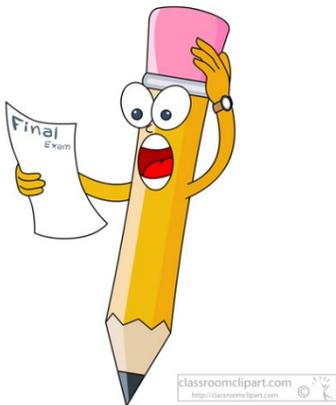
What is the purpose of employing assessments in our courses?

To assign a grade at the end of the semester

Tool to collect data that evaluates teaching and learning

Monitor Learning

Promote Learning



Types of Assessment



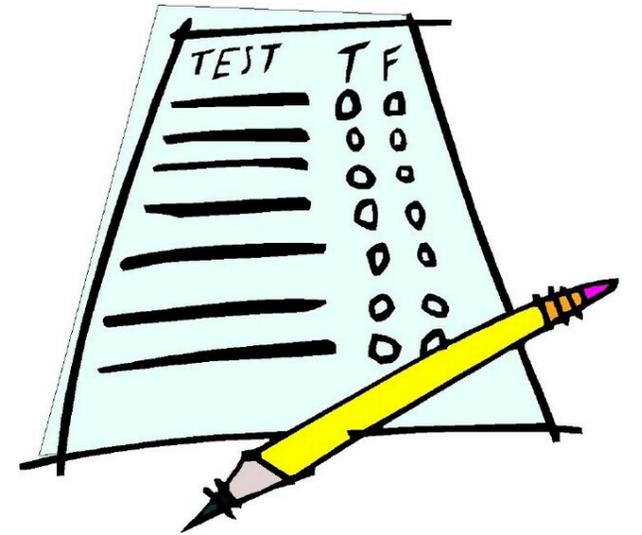
FORMATIVE SUMMATIVE

Summative Assessments

Used to Determine What Students HAVE LEARNED

Administered at END of Instructional Period
Evaluative not Diagnostic

Recorded as Scores or Grades
Typically High Stakes



Formative Assessments

Used to Determine How Students are Progressing

Administered DURING Instructional Period

Diagnostic

Identify Deficiencies, Misconceptions

Used as a Tool for Learning

Typically Low Stakes

3-2-1

3 Facts You Learned

1. _____

2. _____

3. _____

2 Questions You Still Have

1. _____

2. _____

1 Opinion You Have

1. _____

© 2012 Delena Allen-Learn With ME in Grade Three

Summative
Assessments



Formative
Assessments



When Implemented
Intended Purpose
Impact on Grade



How do I design an assessment that is an effective tool for learning?

Work Backwards Within Your Course

Determine Learning Goals

Know

Understand

Be Able to Do



Determine the Hierarchy of Goals



Bloom's Taxonomy



Determine Learning Outcomes

What Performances or Behaviors will Indicate
Accomplishment of Goals?

Consider:

Criteria that differentiate different levels of learning
How will students know when they are learning?
How will I know they are learning?

Establish Alignment



Design or Create an Activity that will Align with your Learning Goals and Outcomes

Clickers

Correct the statement (diagram or picture)

Concept mapping (“mind” mapping)

Pre-post questions

Minute papers

Write an Exam Question

Think-Pair-Share

Complete a chart or graph



EXAMPLE 1

Learning Goal



Learning Outcome



Formative Assessment Activity

Students will learn the correct terminology for the contractile proteins in skeletal muscle

Bloom's level 1

When given a list of terms, students will correctly identify the skeletal muscle contractile proteins

M/C mini quiz:
Use clickers, Poll everywhere;
show of hands; Paper and pencil scantron

EXAMPLE 2

Learning
Goal



Learning
Outcome



Formative
Assessment Activity

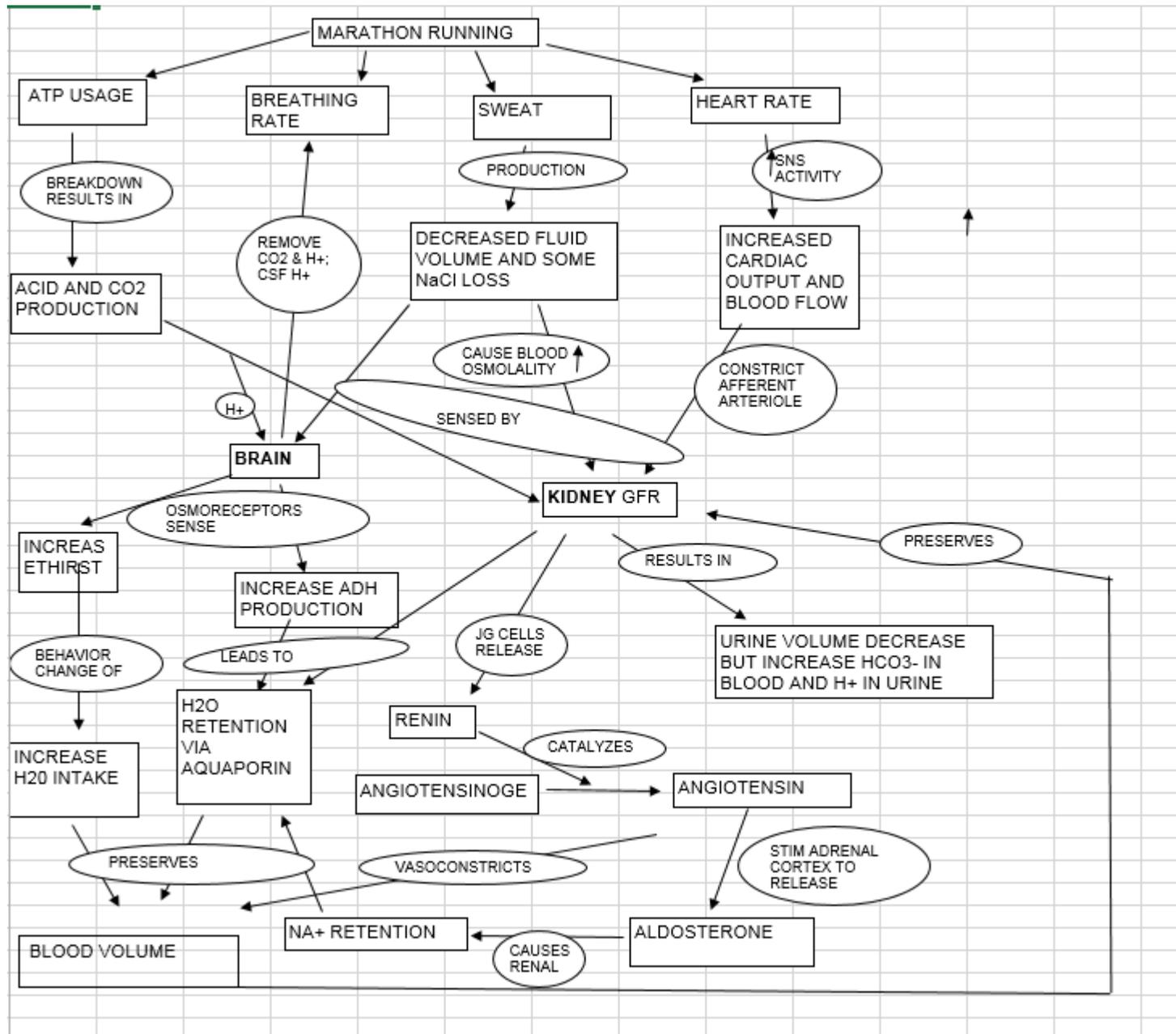
When presented with a whole body physiological event, students will apply their understanding of individual organ systems' functions to demonstrate how the body will handle the event and maintain homeostasis.

Bloom's level 3-5

Given a list of terms, students will be able to construct a map outlining how a change in one physiological system leads to a network of changes in other physiological systems. Greater global understanding is demonstrated by the greater interconnectivity and accuracy of descriptions linking terms.

Running a Marathon Concept Map Activity

Design and develop a concept map demonstrating how the body maintains homeostasis to complete the marathon (avoiding demise....).



Does Formative Assessment Work?

Advanced accounting students exposed to concept mapping during instruction performed 15.7% better than controls who did not receive this instruction this instruction ($p < 0.05$).

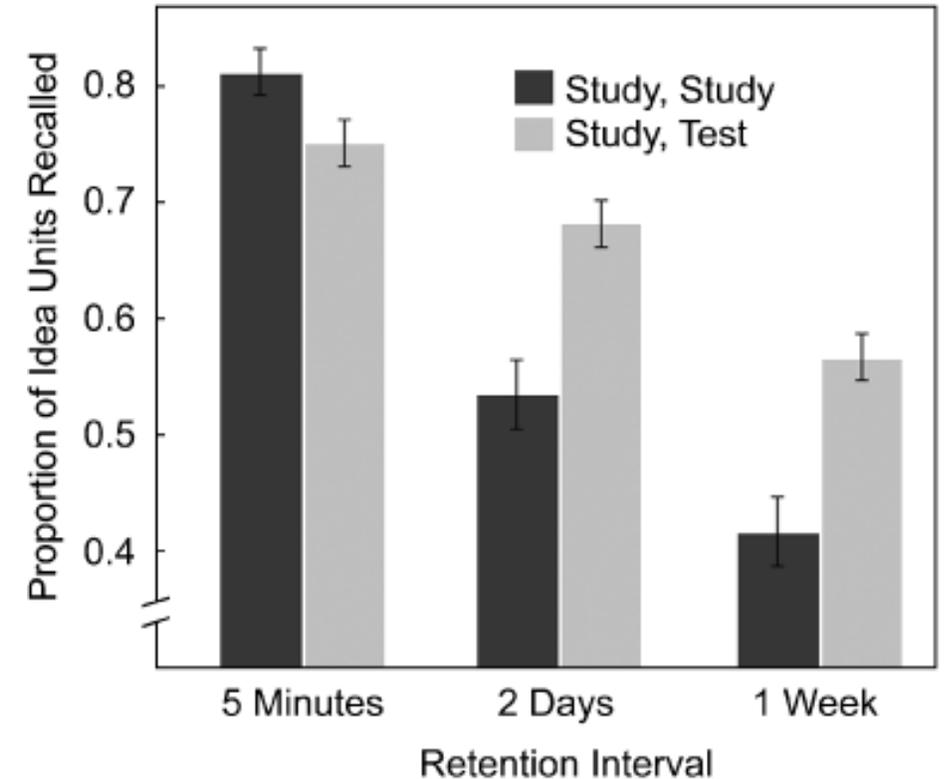
Students (89%) also reported that concept mapping enhanced their interest in learning accounting; 95% reported that concept mapping helped them learn and think independently.

Chiou C-C. 2008.

First year engineering students enrolled in mathematics course completing multiple quizzes monitored in class showed significant association between quiz performance and final exam scores.

$R^2 = 0.3 - 0.56$; $p < 0.01$ over 4 semesters

Hannah et al. 2014



3 groups of students; same preparation time; studied 2 science related passages; asked to recall specific information at given times.

Roediger III HL and Karpicke JD. 2006.

Collaborative Test Taking

When Summative Assessments become Formative Assessments

1. Students take an exam on material they have studied.
2. Exam answer sheets/papers are returned to instructor; but students receive no feedback or grade.
3. Students are then given the blank exam again. Students work collaboratively in groups of 3-4 to answer the questions; use books, notes, etc.
4. Return new answer sheets/papers to the instructor.
5. Both sets of exams are graded.

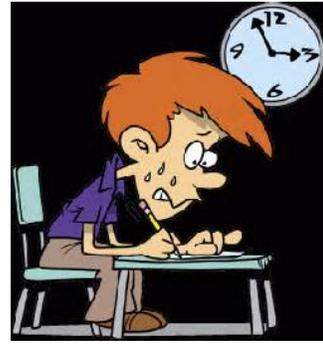
Scores are tabulated as follows:

Weighted scores are assigned to each type of exam. Instructor's choice.
75% of grade is for initial individual exam; 25% on collaborative exam.

For a student who scored a 50% on first individual exam, and 100% on collaborative exam, the combined scores would be 62.5%.



Benefits of Collaborative Test Taking



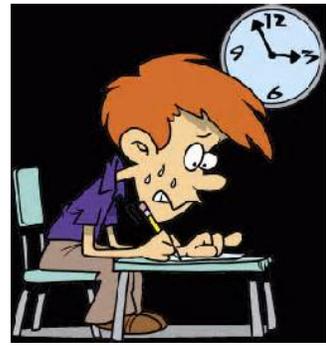
Collaboration improves scores: range **23% - 79%** improvement in mean exam score when repeated exam is taken collaboratively vs. original exam taken individually (Gilley and Clarkston, 2014; Bloom, 2009).

Collaboration is better than individual 'note-surfing': **79%** improvement in mean repeated exam scores over same material when allowed to collaborate on repeat exam vs. **9%** improvement when look up notes individually and take repeat exam individually (Bloom 2009).

Collaboration improves retention over 1 month: **52.9%** improvement in mean repeated individual exam scores over same material when *first* exam was taken *collaboratively* 1 mo earlier vs. **46%** improvement when *first* exam taken *individually* 1 mo earlier (Cortright et al 2003).

Collaboration options associated with decreased anxiety, better attitude throughout examination/course (Björnsdóttir et al 2015).

Challenges to Collaborative Test Taking



Grading and evaluation work. Difficult in ultra large classes.

Class time reserved for exam re-takes.

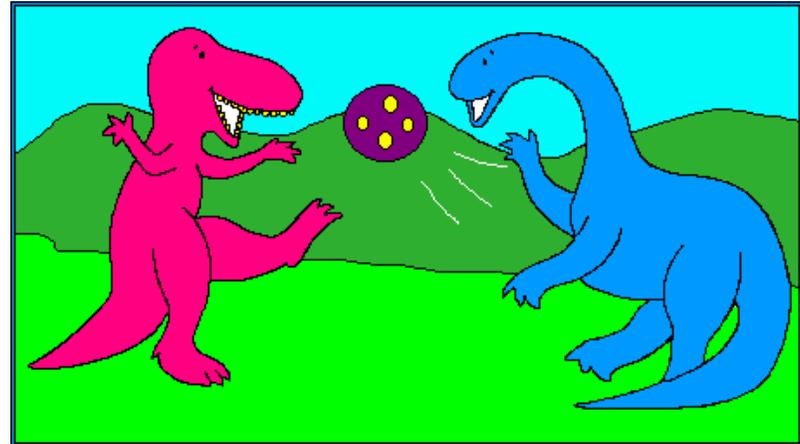
Not the best if you are offering a certification examination.



ANY QUESTIONS?



Now it's your turn.....



TASK:	CONSIDER:	Bloom's Level
1. Think of problem or misconception	What evidence do you have that students struggle with this topic?	6. Evaluation
2. Write Learning Goal - What students should learn.	Do these represent the nature of engineering? Bloom's level?	5. Synthesis
3. Learning Outcome - What performance will demonstrate learning?	How do you measure progress toward learning goals?	4. Analysis
4. Design formative assessment activity - Engage the students	In what ways will this engage the students? How might you assess their engagement?	3. Application
5. Check Alignment	Does this assessment drive learning toward the goal?	2. Understanding
		1. Knowledge

Learning Goal



Learning Outcome



Formative Assessment Activity

Suggested Reading and References

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