

ENHANCING LEARNING WITH ASSESSMENT TOOLS

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WORKSHOP OUTCOMES

By the end of this workshop, you will be able to:

- Summarize research on using assessment as learning
- Use assessment tools such as mTuner, IF-AT cards and online quizzes to enhance student's learning



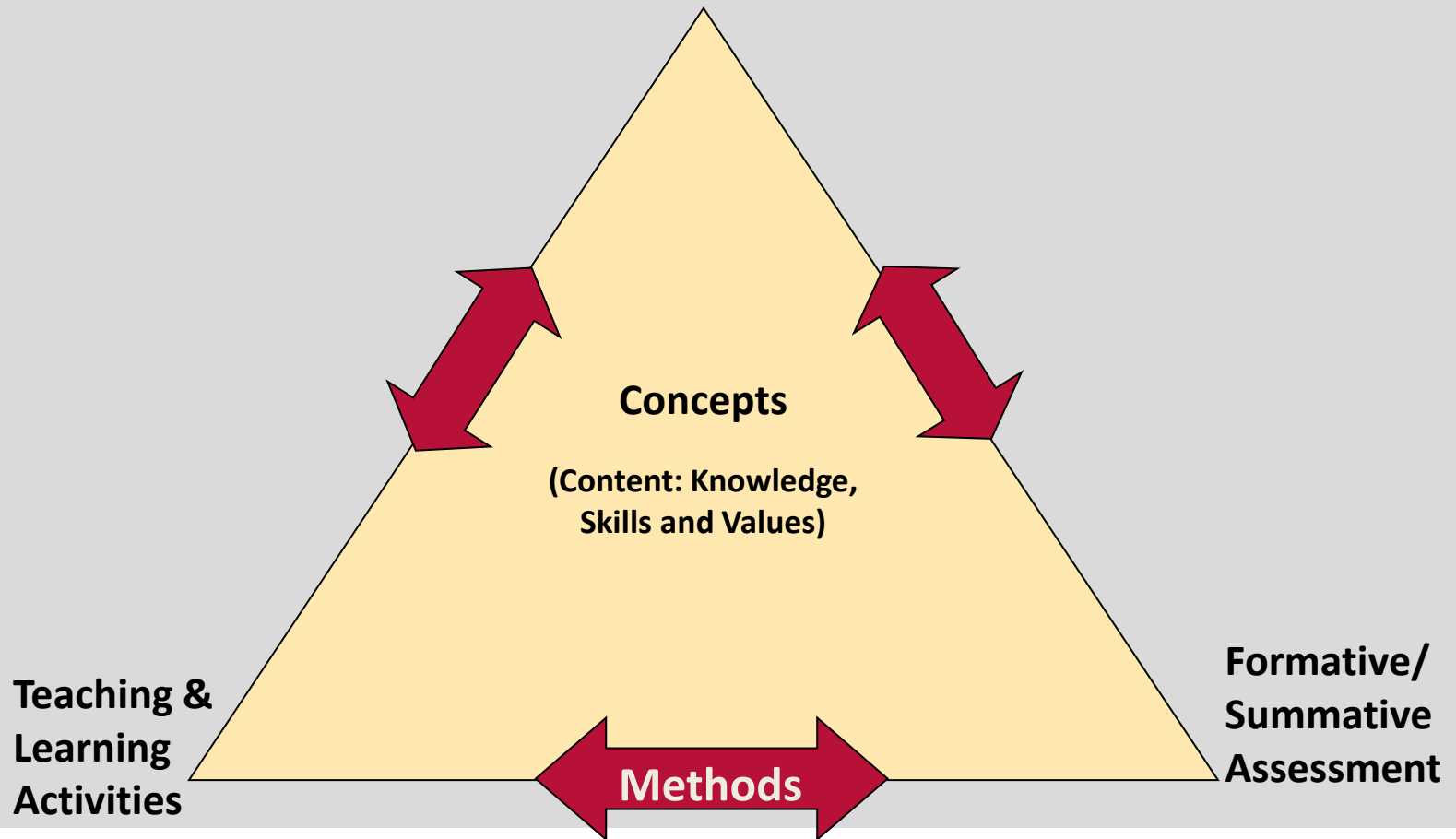
OUTLINE

- Introduction to assessment for learning
- Overview of Sample Tools for Learning
 - mTuner
 - Quizlet
 - MapleTA
 - IF-AT cards



COURSE DESIGN MODEL

Intended Learning Outcomes



ASSESSMENT FOR LEARNING

- Testing effect/test enhanced learning : retrieval practice using active recall results in long term retention (review Roediger and Butler, 2011)
- Students most receptive to learning in assessment situation (McDaniel et al., 2007)
- Review of literature of learning strategies suggest practice testing and distributed practice (spacing) are most effective (Dunlofsky, 2008)
- Immediate feedback enhances learning (Butler et al., 2008) and prevents incorrect answer from being “cemented” (Roediger and Marsh, 2007)
- How students are assessed dictates what they learn (Biggs, 1999; Mazur, 2014)





- On line quizzing tool developed by Steve Joordens,
 - » First stage retrieval practice
 - » Then question options
 - » If incorrect hint (cue) followed by second attempt
 - » Feedback given to all
- <https://mtuner.ca/> (teststudent1 –user name and password)

mTUNER

Some of the cells in a single organism have 22 chromosomes and some have 21 chromosomes and some have 23 chromosomes. How could this situation arise?

Type your answer here...

Submit

Some of the cells in a single organism have 22 chromosomes and some have 21 chromosomes and some have 23 chromosomes. How could this situation arise?

nondisjunction at meiosis I

nondisjunction during mitosis in the first cell division in the embryo

nondisjunction at meiosis II

nondisjunction events during mitosis in some somatic cells

If the signal sequence of a protein destined for the mitochondria were deleted where would the protein end up?

in the nucleus

randomly localized to any organelle

secreted by the cell

in the cytosol

Explanation

The normal diploid $2n$ number must be 22, and the haploid $n=11$. Chromosome numbers of 21 and 23 are aneuploids. This pattern of aneuploidy in a single organism indicates it could not have happened in meiosis. Non-disjunction events in meiosis would have produced gametes of 10 OR 12, resulting in aneuploid offspring of numbers 21 OR 23, not both in the same individual. Nondisjunction events during meiosis always create organisms that are entirely aneuploidy. This points to a problem in mitosis during early embryo development. The majority of the cells will remain at 22, but nondisjunction events in one (or a few) of the cells during mitosis can cause the resulting daughter cells to have an abnormal chromosome number (of 23 and 21). These chromosome numbers will be faithfully maintained by normal mitosis throughout the cell generations, causing the whole organism to be affected.

Close

Some of the cells in a single organism have 22 chromosomes and some have 21 chromosomes and some have 23 chromosomes. How could this situation arise?

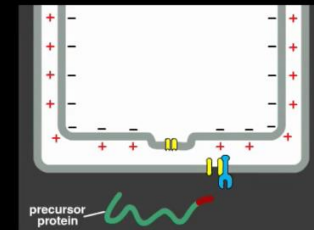
nondisjunction at meiosis I

nondisjunction during mitosis in the first cell division in the embryo

nondisjunction at meiosis II

nondisjunction events during mitosis in some somatic cells

Hint



Close



mTUNER

Pros

- Students see questions without prompts
- Multiple “types” of hints possible
- Feedback provided after each question

Cons

- MCQ so must be thoughtful to develop higher order questions



QUIZLET <http://quizlet.com/>

- Free, practice quizzing tool available in 18 languages including Arabic (\$25 annual fee for enhanced teacher version which includes voice recording)
- Mobile apps (iphone, ipad, Android)
- If you want to play:
<http://quizlet.com/70416109/assessment-technologies-flash-cards/>
<https://quizlet.com/87630942/language-flash-cards/?new>



QUIZLET

Pros

- Students can test as often as they like, whenever they like
- Audio and various language capabilities
- Gaming features

Cons

- Primarily lower order questions



IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF-AT)

- <http://www.epsteineducation.com/home/>
- immediate feedback received - affirmative or corrective
- Provide the benefits of testing effect with the potential for peer learning
- IF-AT cards ~ \$125 per 500 forms



IF-AT TEST

- Answer the following questions on your own, and then decide upon an answer as a group
- Score according to the following:
 - » First choice correct = 2 points
 - » Second choice correct = 1 point
 - » Third or fourth choice correct = 0 points

IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)

Name _____ Test # _____

Subject Phy 100A Total 175/200

SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	E	Score	
1.					*	10	10
2.	*					10	20
3.		*				0	20
4.			*			10	30
5.					*	10	40
6.	*					10	50
7.					*	10	60
8.				*		10	70
9.					*	10	80
10.			*			10	90
11.					*	10	100
12.	*					10	110
13.				*		10	120
14.					*	10	130
15.					*	10	140
16.		*				0	140
17.			*			10	150
18.	*					5	155
19.			*			10	165
20.	*					10	175

IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF-AT)

- Team Based Learning <http://www.teambasedlearning.org/>
- Two stage exams
http://www.cwsei.ubc.ca/resources/files/Two-stage_Exams.pdf
- Integrated testlets
 - *Slepkov A.D. (2013) Integrated testlets and the immediate feedback assessment technique. Am. J. Phys. 81 782-791*



IF-AT ASSESSMENT

Pros

- Peer learning possibility
- Immediate feedback
- Active classroom learning

Cons

- Some manual grading required



QUIZZES WITHIN LMS

- As a part of the LMS (ie Blackboard) , no need to login elsewhere, no additional cost and familiar environment
- Variety of question types possible including MC, T/F, MS, matching, ordering and quantitative
- Similar to mTUNER hints and feedback are possible



LEARN – HINTS AND FEEDBACK

Question 4 (1 point)

Which of the following represents a hydroxyl group?

- R-SH
- R-NH₂
- R-OH
- R-CH₃

∨ [Hide hint for Question 4](#)

O represents oxygen

C represents carbon

N represents nitrogen

S represents sulfur

R represents the carbon backbone

Question 4

Which of the following represents a hydroxyl group?

- R-SH
- R-CH₃
- R-OH
- R-NH₂

∨ [Hide Feedback](#)

The hydroxyl group is composed of one hydrogen atom bonded to one oxygen atom. Its chemical formula is written as **-OH**.



MapleTA ([click for video](#))

Understands math (core of STEM)

- Algebra, Calculus, Statistics, Finance,...
- Math notation (input and display): numbers, expressions, equations, lists, vectors, matrices
- Visualizations: 2d. 3d. animations, charts, apps

Quiz types

- Quiz: tests, practice: savable, printable, many settings
- Adaptive: advance/retreat among pools of questions depending on performance
- Study session: no set number of questions – try again if wrong

<http://courseware.cemc.uwaterloo.ca/>



LET'S CONSIDER AN APPLICATION

Work individually for 3 minutes.

- Consider how you might use one of the tools presented today in your own teaching.
- How would you leverage the tool to provide a learning opportunity?
- Where and how would you use it?

Share your ideas with a partner (6 minutes per person).

- Allow your partner to ask questions . These questions may help you to better define your own ideas.
- Discuss the advantages and/or disadvantages to using the selected tool for your selected context.



TOOL COMPARISON

mTuner	Quizlet	IF-AT	LMS	MapleTA
<ul style="list-style-type: none"> • Retrieval practice • Hints (many options) • Immediate detailed feedback 	<ul style="list-style-type: none"> • Good for practice • Gaming • Free 	<ul style="list-style-type: none"> • Immediate feedback • Group learning 	<ul style="list-style-type: none"> • hints and feedback • Paid by institution • Conditional release 	<ul style="list-style-type: none"> • STEM • Free at UW • Test and Practice questions • Adaptive
<ul style="list-style-type: none"> • MCQ • Fees 	<ul style="list-style-type: none"> • Primarily memory questions 	<ul style="list-style-type: none"> • In class only • fees 	<ul style="list-style-type: none"> • Most have many settings and can be confusing to set up 	<ul style="list-style-type: none"> • Advanced question types are complicated to set up



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