SELF-SERVICE LEARNING AND REMEDIATION: HELPING STUDENTS TAKE OWNERSHIP OF THEIR LEARNING

AP National Conference
July 20, 2013

Brett Erdmann
Amy Inselberger
Christina Palffy
Tony Reibel
Adlai E. Stevenson High School
Lincolnshire, Illinois
STUDENTS OR LEARNERS?
“STUDENTS”

- Want good grades
- Externally motivated by “carrots and sticks”; Engage in quid pro quo (Pink)
- “Fixed” mindset (Dweck)
- Want to be the best at all times in everything
- Failure is a punishment
- Individuals
- Consumers of knowledge
- Cultivated by “sage on the stage” teaching methods

“LEARNERS”

- Want meaningful experiences
- Internally motivated; Must be emotionally/intellectually invested (Pink)
- “Growth” mindset (Dweck)
- Want to continuously improve and self-actualize
- Failure is an opportunity
- Community
- Share in process: Constructivist
- Cultivated through cooperative learning and “self-service” tools
TODAY’S LEARNING TARGETS

• I will understand the value of students taking ownership of their learning
• I will identify and implement practical strategies to assist students
WHAT STUDENT RESPONSIBILITY IS NOT ABOUT…
7 STRATEGIES FOR ASSESSMENT FOR LEARNING

• Students must know where they are going
  1. Provide clear, understandable vision of the learning target
  2. Use examples and models of strong and weak work

• Students must know where they are now
  3. Offer regular, descriptive feedback
  4. Teach students to self-assess and set goals

• Students must know how to close the gap
  5. Design lessons that focus on one aspect of quality at a time
  6. Teach students focused revision
  7. Engage students in self-reflection, and let them keep track of and share their learning.

Chaupis, 2009
WHAT IS A LEARNING TARGET?

• Action oriented statement (“I will…” or “I can…”)
• Designed for students, written in “student” language
• Clearly defined with sufficient detail (not a broad GOAL)
• Linked to formative and summative assessment
• Shared (between student and teacher)

“The first thing students need to learn…
...is what they're supposed to be learning.”

HOW DO I WRITE A LEARNING TARGET?

A target will be written in a way that allows the student to answer the following questions:

A. What will I be able to do when I've finished this lesson?
B. What idea, topic, or subject is important for me to learn and understand so that I can do this?

“Target practice” (formative assessment) will be constructed to allow the student to answer this question:

C. How will I show that I can do this, and how well will I have to do it?

LEARNING TARGETS – “VEGAS STYLE”

Content Target- I will be able to recognize and describe the 10 poker hands in order from highest to lowest ranking.

Process Target- I will use knowledge of poker hands to make appropriate wagers when playing Texas Hold ‘em.
WHY EMPLOY TARGETS?
“There was a lot of information covered on the tests and a lot of information in the reading so the targets helped to narrow down the main topics and organize the information into sections better... Sometimes I spend too much time on the little things or topics that aren't necessarily that important so the targets helped me focus on the key topics”

--Lexi
TESTS ALIGN WITH STUDENT EXPECTATIONS, NO “GOTCHAS” OR BIG SURPRISES!

“The targets really helped me discern important information from unimportant information when reading. I could focus on the essentials, and that made my work less time-consuming. It also made the tests very fair. Everything we needed to know was on the target sheet.”

--Zach
“The first test of the year I was completely lost because *I've never really studied before*. Having targets served as a good crutch for me to almost learn how to study. They definitely eliminated busy work because I wasn't looking through notes with no idea of what was going to be on the test. After the test it also helped because I found that on most tests I would get the majority of the answers wrong on a single target. This helped me focus on what I needed to study when finals and the AP exam came around.” – Scottie
A FRAMEWORK IS PROVIDED TO HELP STUDENTS CONNECT THE PUZZLE PIECES

“The targets became my outline and I used my notes and the book to fill in the outline created by the target points to make sure that I was prepared for the exam.”

-- Sami
“Targets are not “cure-alls”

“I think they helped me to focus too much on specific topics in the attempt to get a good grade (because I knew that’s exactly what would be assessed on exams) rather than understanding material. They are too limiting in this sense. However, they did provide for a focus; a way to choose which topics to explore in depth. These targets, when viewed in this light, reflect the limitations of AP in general.”

--Nathan
CLASSROOM STRATEGIES TO PROMOTE “COMMUNITY OF LEARNERS”

- Classroom Posters
  - We use **LEARNING TARGETS** to monitor our learning progress.
  - We believe that our abilities are not **FIXED** and we approach learning with a **GROWTH** mindset.
  - We strive for **PERSONAL MASTERY** and avoid comparison with others.
  - We use **FORMATIVE FEEDBACK** to create a recipe for future action rather than review our past failures. We **SELF ASSESS** and make **CHOICES** regarding our learning.
  - We **COLLABORATE** and **SUPPORT** each other in a **COMMUNITY OF LEARNERS**.

- Language Used with Students

- Cooperative Learning
### Ecology & Behavior
#### UNIT 1 TARGETS

The student will be able to:

<table>
<thead>
<tr>
<th>CONTENT-BASED TARGETS</th>
<th>TEXT REFERENCE</th>
<th>LABS, HANDOUTS, &amp; ACTIVITIES</th>
<th># TEST PTS</th>
</tr>
</thead>
</table>
| I. Identify and define the different levels of ecological organization.  
  Address the following categories: Biosphere, Biome, Ecosystem, Community,  
  Population, Individual, Cell.                                                | 52.1, 52.3,  
  52.4                  | Target  
  Practice/Wiki               | 7           |
| II. Describe the flow of energy and materials through trophic levels in ecosystems.  
  Be able to analyze and explain the following graphical representations:  
  Food Webs, Food Chains, Pyramids (Energy, Biomass, Numbers).  
  Incorporate the following terms in your explanations: biological  
  magnification, producer, primary consumer, secondary consumer,  
  tertiary consumer, herbivore, carnivore, omnivore, 10% rule | 54.2, 55.1,  
  55.3                  | Target  
  Practice/Wiki               | 16          |
| III. Analyze and explain survivorship curves (Type I, II, II).  
  Explain how r-selected and K-selected species relate to specific curve types. | 53.1         | Target  
  Practice/Wiki               | 7           |
| IV. Analyze and explain logistic and exponential growth graphs.  
  Apply the following terms to your discussion: limiting factors, carrying capacity,  
  and equilibrium.                                                              | 53.3, 53.4    | Target  
  Practice/Wiki               | 7           |
| V. Discuss how biotic and abiotic limiting factors (density dependent and density  
  independent) affect population size. For biotic factors, address  
  predator/prey relationships and competition.                                    | 52.2, 53.5    | Target  
  Practice/Wiki               | 5           |
| VI. Explain how the different relationships among organisms can affect populations.  
  Address the following: mimicry (Mullerian and Batesian),  
  symbiosis (Mutualism, Parasitism,                                            | 53.5, 54.1    | Target  
  Practice/Wiki               | 7           |
## On-Going Target Assessment and Cooperative Remediation During the Unit

- **Target Practice**
- **Concept Webs**
- **Kagan Activities**—Use Quizlet to help
  - Quiz Quiz Trade
  - Think Pair Share
  - Round Robin

### Card Image

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Four of a kind</td>
<td>Four of the same kind of card</td>
</tr>
<tr>
<td>7. Three of a kind</td>
<td>Three of the same kind of card</td>
</tr>
<tr>
<td>8. Two pair</td>
<td>Two different pairs of cards</td>
</tr>
</tbody>
</table>
MORE WAYS TO DO COOPERATIVE REMEDIATION

- Cup Activity—Lets try it with paper
  - Remember our target from earlier?
  - Content Target—I will be able to recognize and describe the 10 poker hands in order from highest to lowest ranking.
    - If you feel that you have mastered this target, hold up a green paper.
    - If you feel that you know something about the target, but not everything, hold up a yellow paper.
    - If you feel that you know little to nothing about the target, hold up a red paper.
WHAT ABOUT AFTER A TEST?

- Ideally, students do enough self assessment and make the proper choices regarding their learning, so that they master all targets on the unit test.
- Of course, this does not always happen.
- After taking the test, students will test journal to reflect on items they missed and targets they mastered and did not master.
Test journaling involves students writing about each item on the test that they missed in a notebook that is kept in the classroom.

First, the questions that were most missed by the class are discussed as a class.

Then, 20-30 minutes is given so that students can look at all of the items they missed on the test.

For each item missed, students write a statement about the concept related to the item.
Students also write whether it was lack of content knowledge, test taking error, or inability to properly apply knowledge.

Students also keep track of which target the question relates to.

This allows students to determine patterns in their test taking errors and which targets they are missing the most.
Test item: You are playing Texas Hold ‘em and holding an ace of hearts and four of spades. On the table are an ace of diamonds, and ace of clubs, a 2 of hearts, a 3 of diamonds and a 5 of hearts, what is the highest ranking poker hand?

Student answer: 3 of a kind

Correct answer: Straight

Student must write about why they missed this question. Did they not know that a straight is higher than 3 of a kind? Did they not read the question carefully to see that there was a straight possible? Should they have drawn a picture to help them? Did they not realize that a straight did not have to be the same suit?
TEST JOURNALING EXAMPLE

Student might write:

- Target 1 Content knowledge gap. I got this item wrong because I didn’t realize that a straight is higher than three of a kind. I need to study Target 1 more so that I know which poker hands are higher than others. Use the quizlet on the wiki to better learn this material.

or

- Test taking error. I read this item too quickly and did not bother drawing out the hand. I know a straight is higher than 3 of a kind, but due to reading too quickly, I thought only three of a kind was possible. Slow down during test taking. Read every item carefully. Draw when needed.
STUDENTS CAN THEN DETERMINE HOW WELL THEY DO ON EACH TARGET

- To do this, it is helpful to give students a sheet that shows each target and the question numbers related to that target.

- Students can then tabulate how many questions they got right and wrong for that target.
HERE IS AN EXAMPLE OF A SHEET THAT SHOWS THE TARGETS AND THE QUESTIONS RELATED TO EACH BIG IDEA

<table>
<thead>
<tr>
<th>BI 4</th>
<th>Population, Individual, Cell.</th>
<th>36, 37, 38</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>Describe the flow of energy and materials through trophic levels in ecosystems. Be able to</td>
<td>1 – 7, 32, 33, 35, 36, 37, 38, 39, 42, 46</td>
</tr>
<tr>
<td></td>
<td>analyze and explain the following graphical representations: Food Webs, Food Chains, Pyramids (Energy, Biomass, Numbers). Incorporate the following terms in your explanations: biological magnification, producer, primary consumer, secondary consumer, tertiary consumer, herbivore, carnivore, omnivore, 10% rule.</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Analyze and explain survivorship curves (Type I, II, III). Explain how r-selected and K-selected species relate to specific curve types.</td>
<td>14, 16 – 19, 20, 21</td>
</tr>
<tr>
<td>IV</td>
<td>Analyze and explain logistic and exponential growth graphs. Apply the following terms to your discussion: limiting factors, carrying capacity, and equilibrium.</td>
<td>10 – 12, 22, 44, 45, 53</td>
</tr>
<tr>
<td>V</td>
<td>Discuss how biotic and abiotic limiting factors (density dependent and density independent) affect population size. For biotic factors, address predator/prey</td>
<td>15, 30, 55, 59, 60</td>
</tr>
</tbody>
</table>
USE OF MASTERY MANAGER

- Mastery Manager is a program that allows for various data to be analyzed from an assessment.
- For the purpose of test remediation, it can be used so that students get a report that tells them how well they did on each target.
- The science practices and Big Ideas can also be coded into Mastery Manager, so that students can see what practice they need.
<table>
<thead>
<tr>
<th>Description</th>
<th>Points</th>
<th>Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCI631-AP BIO UNIT 5 ECOLOGY 12_13  85%</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Selbergen, A</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>School:</strong> Stevenson High School</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Date:</strong> 4/15/13</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Points</strong></td>
<td><em>Total</em></td>
<td></td>
</tr>
<tr>
<td><strong>Assessments</strong></td>
<td></td>
<td><em>Total</em></td>
</tr>
<tr>
<td><strong>Science (2012)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>IG IDEA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify and define the different levels of ecological organization. Address the following categories: Biosphere, Biome, Ecosystem, Community, Population, Individual, Cell. (Questions: 13, 27, 31, 52, 56, 57, 58)</td>
<td>7 of 7</td>
<td>1</td>
</tr>
<tr>
<td><strong>IG IDEA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describe the flow of energy and materials through trophic levels in ecosystems. Be able to analyze and explain the following graphical representations: Food Webs, Food Chains, Pyramids (Energy, Biomass, Numbers). Incorporate the following terms in your explanations: biological magnification, producer, primary consumer, secondary consumer, tertiary consumer, herbivore, carnivore, omnivore, 10 % rule (Questions: 1 (P.E.), 2 (P.E.), 3 (P.E.), 4 (P.E.), 5 (P.E.), 6 (P.E.), 7 (P.E.), 32, 33, 35, 36, 37, 38, 39, 42, 46)</td>
<td>17 of 18</td>
<td>1</td>
</tr>
<tr>
<td><strong>IG IDEA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyze and explain survivorship curves (Type I, II, III). Explain how r-selected and K-selected species relate to specific curve types. (Questions: 14, 16, 17, 18, 19, 20, 21)</td>
<td>6 of 7</td>
<td>1</td>
</tr>
<tr>
<td><strong>IG IDEA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyze and explain logistic and exponential growth graphs. Apply the following terms to your discussion: limiting factors, carrying capacity, and equilibrium. (Questions: 10 (P.E.), 11 (P.E.), 12 (P.E.), 22, 44, 45, 53)</td>
<td>8 of 10</td>
<td>1</td>
</tr>
<tr>
<td><strong>IG IDEA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discuss how biotic and abiotic limiting factors (density dependent and density independent) affect population size. For biotic factors, address predator/prey relationships and competition. (Questions: 15, 30, 55, 59, 60)</td>
<td>3 of 5</td>
<td>1</td>
</tr>
<tr>
<td><strong>IG IDEA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explain how the different relationships among organisms can affect populations. Address the following: mimicry (Mullerian and Batesian), symbiosis (Mutualism, Parasitism, Commensalism), niche, habitat, competitive exclusion, camouflage, adaptation (Questions: 23, 24, 25, 26, 28, 29, 34)</td>
<td>6 of 7</td>
<td>1</td>
</tr>
<tr>
<td><strong>IG IDEA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Define, explain, and identify examples of organism behavior. Address the following: taxis, kinesis, signstimulus, fixed action patterns, imprinting (Questions: 47, 48, 49, 50, 51)</td>
<td>4 of 5</td>
<td>1</td>
</tr>
<tr>
<td><strong>IG IDEA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compare and contrast the biogeochemical cycles: nitrogen, phosphorus, carbon. (Questions: 40, 41, 43, 54)</td>
<td>2 of 4</td>
<td>1</td>
</tr>
<tr>
<td><strong>PRACTICE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calculate population growth rates (Questions: 8 (P.E.), 9 (P.E.))</td>
<td>2 of 2</td>
<td>1</td>
</tr>
</tbody>
</table>
ONCE STUDENTS KNOW HOW THEY DID, THEY CAN REMEDIATE THE TARGETS OR SCIENCE PRACTICES THEY DID NOT MASTER

- Teachers determine what “mastery” of a target means.
- Any targets on which students achieved under that level, they may remediate.
- There are countless ways to remediate, but we will show you a few that we have used.
BUT FIRST—A DISCUSSION:
POINTS OR NO POINTS?

- Should points be given for remediation?
- If so, how should they be given?
REMEDIATION METHOD #1 COME IN TO SEE THE TEACHER

- This method is great and probably our favorite in an ideal world.
- However, due to the busy schedule of students and teachers, not all students can find time to see their teacher when the teacher is available.
- This method is especially useful for students who are struggling in the science practices.
REMEDIATION METHOD #2
SELF SERVE WIKI

- Set up a webpage or wiki organized by units and targets to help your students find resources that will help them review, learn and practice the material.

- These resources can include videos, websites, tutorials, virtual labs, and quizzes.
A WIKI CAN SERVE AS A VALUABLE WAREHOUSE FOR TARGETED REVIEWS
QUIA QUIZZES ALLOW STUDENT TO SELF-ASSESS THROUGH ACTIVE PRACTICE

2. Target 1
In Griffith’s experiment, he mixed heat-killed S-strain bacteria with live, harmless bacteria from the R-strain. When this mixture was injected into mice, the mice _____________________________. (1 point)

3. Target 2
Based on Chargaff’s rule, the percentage of cytosine in the DNA of the bacterium, *S. Lutea* in Figure 12-3, should be around (1 point)

<table>
<thead>
<tr>
<th>Nitrogenous Bases (%)</th>
<th>A</th>
<th>G</th>
<th>T</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human</td>
<td></td>
<td>19.9</td>
<td>29.4</td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td>28.8</td>
<td></td>
<td></td>
<td>21.5</td>
</tr>
<tr>
<td>Bacterium (<em>S. lutea</em>)</td>
<td>13.4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 12–3*

4. Target 1
What stores information in a cell? (1 point)
- proteins
- carbohydrates
- lipids
- DNA
SELF-ASSESSMENT IS DIFFICULT WITHOUT ANSWER KEYS OR FEEDBACK THAT LETS STUDENTS KNOW IF THEY’VE MET THE GOAL.

UNIT TARGET MATERIALS, POWERPOINTS, AND DIAGRAMS

- ErdmannCellsTargetI.ppt
  Complete PowerPoint Notes for Target I- "Mastery of Cell Structure & Function"
  Includes List of Organelles That Will Be Covered On Test

- ErdmannTransportTargetII.ppt
  Complete PowerPoint Notes for Target II- "Mastery of Membrane Structure & Function"

- CellsMembranesTransportTargets.doc
  Complete Targets and Target Practice For The Unit

- CellsTargetPacketAnswers.pdf
  Complete Target Packet Answer Key

- Cells and Transport Diagrams.doc
  Complete Diagrams For Entire Unit In A Single Word File! (Thanks to Vincent Fiorentini, Erdmann AP Bio 2010-2011)
Progress points is a program that allows students to access remediation materials as well as see their progress. Teachers can then also see their progress.
Progress Points

www.progresspoints.com

Formative Feedback Loop Software

Formative Feedback Application
FORMATIVE FEEDBACK LOOP

- **(Goal Line)** - Desired state (Proficiency Goal or Level)
- **(Baseline Entry)** - Current state (Where is the student’s understanding at now)
- **(Growth Chart)** - Compare current with desired state (Reflection Medium)
- **(Envelopes)** - Bring the current state in line with desired state (Academic Vehicle)

*based on Dylan Wiliam’s “Embedded Formative Feedback”*
How it All Works

What am I going to do to close these gaps?

Am I ok with this gap?
MASTERY STATEMENTS

- After doing activities to remediate the targets, students write a mastery statement to show that they understand the material.
- We use a Google form and the data comes back to us as a spreadsheet.
- Our students get 3 points back on their test if they do this for all targets that they did not master.
<table>
<thead>
<tr>
<th>Student Last Name</th>
<th>Student First Name</th>
<th>Pick Your Unit</th>
<th>Pick Your Target LETTER if applicable (Process-Based)</th>
<th>Write your MASTERY statement for this target.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lasson</td>
<td>Sigal</td>
<td>Unit 6-Ecology &amp; Behavior</td>
<td>A</td>
<td>Taxis is one way an organism behaves. Taxis means that the behavior is directional movement towards or away from a certain stimulus. An example of taxis behavior is an organism moving away from a high-light area to a darker area to meet its favorable environmental condition. Next, kinesis is a non-directional movement towards or away from a certain stimulus. This behavior is usually random and an example is the sow bugs. The bugs would move randomly from petri dish side to side. Also, signstimulus is an external sensory feeling that triggers a fixed action pattern by an organism. A fixed action pattern is a sequence of unlearned acts that is essentially unchangeable and carried out, when initiated. This means that once an organism has a signstimulus then it carries out a set of unlearned behaviors. An example is an armadillo sensing its predator and rolling into a ball. That behavior was unlearned and is caused by a signstimulus. Lastly, imprinting is the formation at a specific stage in life of a long-lasting behavioral response to a specific individual or object. An example of imprinting is ducklings following their mothers around. All of these behaviors are very important in knowing the species better in their own environment.</td>
</tr>
<tr>
<td>Kubo</td>
<td>Ken</td>
<td>Unit 6-Ecology &amp; Behavior</td>
<td>A</td>
<td>Biotic factors are living things that limit population growth. Some are predators, competitors, any living food resources such as berries, and bacteria. Predation limits the amount of organisms towards the bottom trophic levels, and competition decreases chances for survival for those who do not find a mate or do not obtain food resources. Predation, competitors, and food resources are density dependent factors. How many organisms die because of these factors depends on the population size.</td>
</tr>
<tr>
<td>Kubo</td>
<td>Ken</td>
<td>Unit 6-Ecology &amp; Behavior</td>
<td>A</td>
<td>Biotic factors are living things that limit population growth. Some are predators, competitors, any living food resources such as berries, and bacteria. Predation limits the amount of organisms towards the bottom trophic levels, and competition decreases chances for survival for those who do not find a mate or do not obtain food resources. Predation, competitors, and food resources are density dependent factors. How many organisms die because of these factors depends on the population size.</td>
</tr>
</tbody>
</table>