

# Quick Fix

## ENCOURAGING STUDENT APPLICATIONS TO CONCEPTS

ANN HALEY MACKENZIE    STEPHANIE ZINN

How do we know our students understand concepts not covered thoroughly in class? This knowledge can be assessed traditionally with tests and quizzes, but do these assessments give us the full picture?

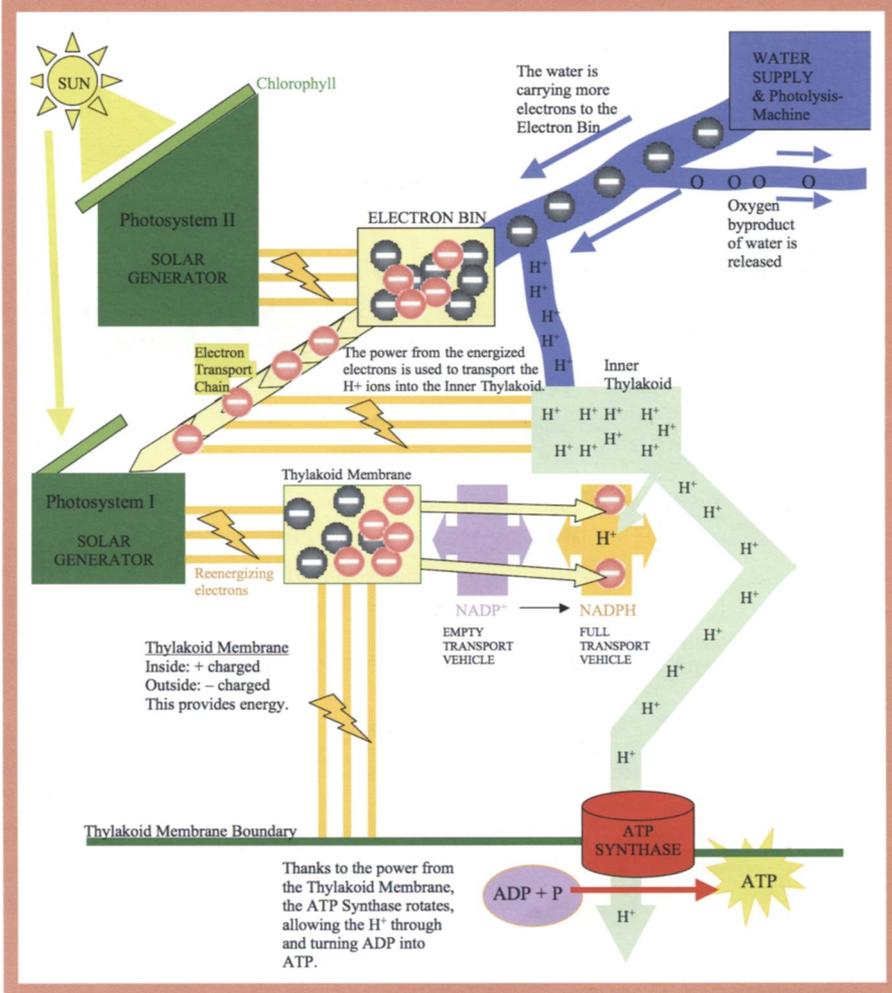
Alternative assessments provide a different portrait of what students know and are able to do. In the case of Josh Barnett in Stephanie Zinn's biology class at Columbia Grammar and Preparatory School, he took the complexity of photosynthesis and created his own diagram for the process, without teacher direction and in preparation for a unit exam. Josh created this diagram on his own after determining the textbook did an inadequate job of portraying this complex set of steps.

Taking Josh's lead, we can provide students with opportunities to demonstrate their knowledge of concepts by doing any of the following activities. For example, with photosynthesis, the students could be involved in:

- creating a YouTube video
- writing a magazine article
- creating a diorama
- writing an editorial
- creating a short story
- designing a scientific investigation
- creating a skit
- designing a cartoon
- making a collage
- designing a mobile
- creating a sculpture, model, or portrait
- designing, conducting, and analyzing surveys
- creating a simulation, on paper, or animated
- creating a board game or computer game
- writing a song
- writing a poem

*The first time I read the explanation in the textbook for the light dependent reactions, I was very confused and didn't understand it. The diagram on the next page was even more confusing. Frustrated, I decided to compare this process to a factory and make my own diagram. For example, Photosystem II and I represent solar generators, taking the energy from the sun via chlorophyll, or their solar panels. I'm a very visual person, and making this diagram really helped to understand this complicated and fascinating process.*

Josh Barnett



- creating an invention
- designing a graph
- conducting an interview
- creating a calendar
- creating a timeline
- designing a mural
- creating a logical argument

ANN HALEY MACKENZIE is Professor, Department of Teacher Education, Miami University, Oxford, OH 45056; e-mail: [mackenh@muohio.edu](mailto:mackenh@muohio.edu).  
STEPHANIE ZINN is a biology teacher at Columbia Grammar and Preparatory School, Manhattan, NY 10025; e-mail: [szinn@cgps.org](mailto:szinn@cgps.org).

How do we assess these projects? The most efficient way is to develop a rubric that provides all the criteria and the levels of accomplishment for each criteria. A rubric can easily be made by going to <http://rubistar.4teachers.org>. This Web site will help

develop a rubric for all sorts of scientific projects as well as for other forms of learning assessments. For instance, in terms of Josh's diagram (if assigned by the teacher), the students would be given the following rubric prior to the project.

Category	4	3	2	1
Title	Title is informative, centered, and larger than other text.	Title is informative and larger than other text.	Title is informative and centered.	The title is incomplete and does not clearly indicate what process is pictured.
Labels	Every item that needs to be identified has a label. It is clear which label goes with which structure.	Almost all items (90%) needing to be identified have labels. It is clear which label goes with which structure.	Most items (75-89%) that need to be identified have labels. It is clear which label goes with which structure.	Less than 75% of the items are labeled correctly or it is not clear which label goes with which item.
Drawing— General	Lines are clear and not smudged. There are almost no erasures or stray marks on the paper if done by hand. OR drawing is computer generated. Color is used to enhance the drawing. Overall, an excellent drawing.	The drawing is by hand. Few erasures or smudges. A few stray marks may be present but don't detract from drawing. Color is used effectively. Overall, a good drawing.	Color not used carefully. The drawing is made with less care. Lines, marks, smudges detract from the drawing. Overall the quality of the drawing is fair.	There are numerous smudges, marks, and lines and there is no color used. Overall the quality of the drawing is poor.
Drawing— Details	All assigned details are added. The details are clear and easy to identify.	Almost all assigned details (at least 85%) are added. The details are clear and easy to identify.	Almost all assigned details (at least 85%) have been added. A few details are difficult to identify.	Fewer than 85% of the assigned details are present. Most details are difficult to identify.
Accuracy	95% or more of the assigned structures are drawn accurately and are recognizable. All assigned structures are labeled accurately.	85-94% of the assigned structures are drawn accurately and are recognizable. All assigned structures are labeled accurately.	85-94% of the assigned structures are drawn accurately and are recognizable. 85-94% of the assigned structures are labeled accurately.	Less than 85% of the assigned structures are drawn and/or labeled accurately.
Spelling	All words are spelled correctly in the title, labels, and caption/description.	All common words are spelled correctly. One to two scientific words may be misspelled.	80% of the words are spelled correctly in the title, labels, and description.	Fewer than 80% of the words are spelled correctly in the title, labels, and description.

Downloaded from <http://online.ucpress.edu/abt/article-pdf/70/5/265/54648/30163270.pdf> by guest on 25 September 2021

## THANK YOU Sustaining Members!

Amphibian Ark, St. Louis, MO

BSCS, Colorado Springs, CO

Carolina Biological Supply, Burlington, NC

Connecticut Valley Biological,  
Southampton, MA

FOTODYNE Inc., Hartland, WI

Kendall/Hunt Publishing Co., Dubuque, IA

Nasco, Inc., Fort Atkinson, WI

SimBiotic Software, Ithaca, NY

Vernier Software & Technology,  
Beaverton, OR

Ward's Natural Science, Rochester, NY

**Interested in Becoming a Sustaining Member? Call NABT at (800) 406-0775.**