Reflective Assessment for the College Student

Paul G. Caron
University of Southern Maine

Proficiency Based Learning

- **Proficiency-based** education refers to any system of academic instruction, assessment, grading and reporting that is **based** on students demonstrating mastery of the knowledge and skills they are expected to learn before they progress to the next lesson, get promoted to the next grade level or receive a diploma.
- Maine Department of Education

The ABCD Objectives

- The Audience-the student for whom the objective is intended.
- The expected Behavior-using verbs that indicate measurable actions.
- The Conditions-the setting in which the behavior will be demonstrated by the student and observed by the instructor.
- The Degree-level of expected performance measured by a rubric.

Modeling Method: What to Teach

- To engage students in understanding the physical world by ***constructing and using scientific models*** to describe, to explain, to predict, to design and control physical phenomena.
- To provide students with ***basic conceptual tools*** for modeling physical objects and processes, especially mathematical, graphical and diagrammatic representations.
- To familiarize students with a small set of basic models as the ***content core*** of physics.
- To develop insight into the ***structure*** of scientific knowledge by examining how *models* fit into *theories.*
- To show how scientific knowledge is ***validated*** by engaging students in *evaluating* scientific models through comparison with empirical data.
- To develop skill in all aspects of modeling as the ***procedural core*** of scientific knowledge.

Modeling Method: How To Teach

- Instruction is organized into ***modeling cycles*** which engage students in all phases of model development, evaluation and application in concrete situations — thus promoting an integrated understanding of modeling processes and acquisition of coordinated modeling skills.
- The teacher sets the stage for student activities, typically with a demonstration and class discussion to establish common understanding of a question to be asked of nature. Then, in small groups, students ***collaborate*** in planning and conducting experiments to answer or clarify the question.
- Students are required to present and justify their conclusions in oral and/or written form, including a ***formulation*** of models for the phenomena in question and ***evaluation*** of the models by comparison with data.
- Technical terms and representational tools are introduced by the teacher as they are needed to sharpen models, facilitate modeling activities and improve the quality of discourse.
- The teacher is prepared with a definite ***agenda*** for student progress and ***guides*** student inquiry and discussion in that direction with "Socratic" questioning and remarks.

CLEARLY DEFINE WHAT IT IS YOU WANT TO ASSESS

- What important cognitive skills do I want my students to develop?
- What important affective skills do I want my students to develop?
- What metacognitive skills do I want my students to develop?
- What types of problems do I want my students to be able to solve?
- What concepts and principles do I want my students to be able to apply?

TWO BASIC PURPOSES FOR ASSESSMENT

- To determine whether and to what extent students have learned specific knowledge or skills (content goals). The assessment should focus on outcomes or products of student learning, such as objective assessments and projects/products.
- To diagnose student strengths and weaknesses and plan appropriate instruction (process goals). Because you are interested in understanding where the student is going wrong, you need to assess the process as well as the product.

PRIORITIZE THESE OUTCOMES

- How much time will it take for students to develop and/or acquire the skill or accomplishment?
- How does the desired skill or accomplishment relate to other complex cognitive, social, and affective skills?
- What is the intrinsic importance of the desired skills and accomplishments?
- Are the desired skills and accomplishments teachable and attainable for your students?

MATCH THE ASSESSMENT TASKS TO THE OUTCOMES

- Does the task match specific instructional intentions?
- Does the task adequately represent the content and skills you expect students to attain?
- Does the task enable students to demonstrate their progress and capabilities?
- Does the assessment use authentic, real-world tasks?
- Does the task lend itself to an interdisciplinary approach?
- Can the task be structured to provide measures of several goals?

RECOMMENDATIONS (PART 1)

- Start small. Follow someone else's example in the beginning, or do one activity in combination with a traditional test.
- Develop clear rubrics. Realize that developing an effective rubric (rating scale with several categories) for judging student products and performances is harder than carrying out the activity. Standards and expectations must be clear. Benchmarks for levels of performance are essential. Characteristics of typical student products and performances may be used to generate performance assessment rubrics and standards for the class.

RECOMMENDATIONS (PART 2)

- Expect to use more time at first. Developing and evaluating alternative assessments and their rubrics requires additional time until you and your students become comfortable with the method.
- Adapt existing curriculum. Plan assessment as you plan instruction, not as an afterthought.
- Make a collection. Look for examples of alternative assessments or activities that could be modified for your students and keep a file readily accessible.

RECOMMENDATIONS (PART 3)

- Assign a high value (grade) to the assessment. Students need to see the experience as being important and worth their time. Make expectations clear in advance.

- Expect to learn by trial and error. Be willing to take risks and learn from mistakes, just as we expect students to do. The best assessments are developed over time and with repeated use.

RECOMMENDATIONS (PART 4)

- Don't give up. If the first tries are not as successful as you had hoped, remember, this is new to the students, too. They can help you refine the process. Once you have tried an alternative assessment, reflect and evaluate the activities. Ask yourself some questions. What worked? What needs modification? What would I do differently? Would I use this activity again? How did the students respond? Did the end results justify the time spent? Did students learn from the activity?

PART 4



To demonstrate your understanding of Newton's three laws of motion you can choose **one** of the following methods:

This section is due by Friday, March 18, 2016.

a. Create a physical demonstration to be presented to the instructor.
b. Create a work of art, music, poetry, or other type to be handed in to the instructor.
c. Create a story that applies the laws.
d. Create a mathematical problem that uses the laws.
e. Create a videotape demonstration.
f. Create something that wows me.

In all situations make sure:

You state the specific law you are explaining.
Refer to all three laws.

Scoring rubric:

25 points: For a complete demonstration showing full understanding and reference to each of three laws.

20 points: For a reference to the three laws and eighty percent of the demonstration is clear and correct.

15 points: For a reference to the three laws but information is missing in more than half to sixty percent of the cases.

5 points: A reference to the three laws.

Part Three of Final: The Concept of Rotational Equilibrium
Carrie Harlow

A shift in center of gravity will result in the body's ability to move or rotate. The movement or rotation of the body is caused by torque. Consequently, balancing and stabilization exercise are a great demonstration of torque and center of gravity. One device in my mind that best describes the concept of rotational equilibrium is balance boards. Balance boards an often used in a rehabilitation centers and fitness centers to increase strength in the intrinsic muscle fibers, increase stability, and to regain neurological function.

Balance boards resemble see saws. The fulcrum is on the bottom of the board placed in the center (some boards allow for the fulcrum to be moved). The top of the board is usually flat and is shaped round, square, or rectangular (I will be mostly talking about the rectangular board). The balance boards works by having the individual stand or placing their hands on the board. When the individual initially steps onto the balance board (with the right foot) right side of the board goes to the floor while the left side goes up into the air (this creates a counterclockwise rotation). As the left foot is placed onto the board the force applied to that side will cause the right side to go up into the air (this creates a clock wise rotation). As both feet are on the board there is a constant shift the forces from clockwise or counterclockwise to establish equilibrium. The rotational equilibrium will be established when the net torque equals zero, which in this case is when the individual balances the board (torque clockwise = torque counterclockwise). The torque is not only determined by the force of body, but also by the placement of the feet (distance from the fulcrum) (T= f * perpendicular d). Consequently, the placement of the feet will affect the balance of the board, if the feet are close to the fulcrum it will be

Dead Cow in the Middle of the Road
By Kimberly Bochtler

Dead cow in the middle of the road
Farmland traffic completely slowed
How did it get there? How did it die?
If someone hit it, where is that guy?
Who can move it? No one knows.
It's got to be moved so traffic can flow.

Farmer A said "I will move it. I'll pull and tug."
Try as he might the cow wouldn't budge.
Farmer B said, "I'll lend a hand."
But they couldn't move it an inch across land
Farmer C, a retired physicist, had to laugh,
"You two would be lucky to move a small calf!"

"Physics can help you to save the day.
An object at rest tends to stay that way.
Newton's First Law speaks of inertia
Exerting force to overcome it, just might hurt ya!
It will take a great force to move this much mass.
Go get a tractor and fill it with gas!"

Back came a farmer with his John Deere
Hooked up the cow, put the tractor in gear
The cow moved slowly and the engine groaned,
"At this acceleration rate, we will never get home.
The force of this tractor just isn't enough
A bigger tractor should have the right stuff!"

The cow accelerated quickly with the bigger force,
Demonstrating Newton's Second Law, of course.
Dead cow now on the side of the road
The story continuing to unfold...

Along comes a car the front all dented
The driver jumps out looking rather demented
"I had to leave and come back --my wife's having a baby
This whole day has been rather crazy!
This cow ran right in front of me.
I hit the brakes, and skidded viscously.
The hood folded toward me as it crinkled and crumbled
The cow mooed madly as she was slammed and then tumbled."

The farmer/physicist said his story was exact in fact.
"The forces oppose each other when two objects interact.